22. Socioeconomics

22.1 Introduction

This chapter describes the socioeconomic setting for the Extended, Secondary, and Primary study areas. Descriptions and maps of these three study areas are provided in Chapter 1 Introduction. Measures of social and economic activity described in this chapter include population, housing, industry earnings[1], income[2], annual jobs[3], unemployment, agricultural economics, and local government fiscal resources, as well as characteristics of the industries in the Primary Study Area. The agricultural industry is discussed for the Extended study areas because of the potential for changes in agricultural water deliveries in those areas, as well as agriculture's widespread and substantial contribution to the State's economy. The recreation industry is discussed because of the potential changes in water availability in reservoirs and rivers and the potential for changes in these resources.

The regulatory setting for socioeconomic resources is discussed briefly in this chapter, and is presented in greater detail in Chapter 4 Environmental Compliance and Permit Summary of this EIR/EIS.

This chapter focuses primarily on the Primary Study Area. However, potential impacts in the Secondary and Extended study areas were evaluated. Potential local and regional impacts from constructing, operating, and maintaining the alternatives were described and compared to applicable significance thresholds. Mitigation measures are provided for identified significant or potentially significant impacts, and because none were identified for this resource, no mitigation is included in this chapter.

22.2 Environmental Setting/Affected Environment

22.2.1 Methodology

The collection of Existing Condition socioeconomic information for the Environmental Setting/Affected Environment and impact assessments was based on available data. It is not uncommon for socioeconomic data to be released on a five- or ten-year interval and for the data to change significantly between intervals. Therefore, the most recent socioeconomic data available at the time this chapter was written was used for the Environmental Setting/Affected Environment and impact assessments.

22.2.2 Extended Study Area

The 39 counties in the Extended Study Area were grouped into five water delivery regions: Bay Area, Central Coast, North Coast, Sacramento Valley, San Joaquin, and Southern (Table 22-1). These regions encompass both small rural counties and large metropolitan counties that receive water from the SWP and CVP and that may be affected by Project-related changes in operations and water delivery.

[1] Industry Earnings: Dollar value of production (sales revenues or gross receipts) from each industry.

[2] Income: Employment income (wages and benefits derived at the workplace, including self-employed income).

[3] Annual Jobs: Total of part-time and full-time hourly wage, salary, and self-employed jobs.

Table 22-1
Counties in Water Delivery Regions – Extended Study Area

Water Delivery Region	Counties Included in Water Delivery Region
Bay Area	Alameda, Contra Costa, Napa, Santa Clara
Central Coast	Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz
Sacramento Valley	Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Plumas, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo
San Joaquin	Calaveras, Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare, Tuolumne
Southern California	Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura

22.2.2.1 Population

Historical, current, and projected population estimates for the five water delivery regions in the Extended Study Area are summarized in Table 22-2. Historically, the Southern California region has the highest population concentration, with approximately 62 percent of the total Extended Study Area population. Approximately 24 percent of the population in the water delivery regions resides in the Bay Area and San Joaquin regions. The population in the Central Coast region accounts for approximately four percent of the overall regional population, and the Sacramento Valley region accounts for approximately nine percent.

Table 22-2
Historical, Current, and Projected Population and Average Annual Growth Rate within the Extended Study Area and California

	Population			Average Annual Growth Rate (%)	
Water Delivery Region	**2000**	**2010**	**2030**	**2000 to 2010**	**2010 to 2030**
Bay Area	4,199,421	4,477,422	5,598,796	0.64	1.12
Central Coast	1,356,626	1,426,240	1,738,133	0.50	0.99
Sacramento Valley	2,850,909	3,286,206	4,528,515	1.43	1.62
San Joaquin	3,397,847	4,072,602	6,683,874	1.83	2.51
Southern California	19,329,839	21,146,847	27,376,256	0.90	1.30
Extended Study Area Total	**31,134,642**	**34,409,317**	**45,925,574**	**1.01**	**1.45**
California	33,871,648	37,253,956	46,688,407	0.96	1.14

Source: DOF, 2012a.

The water delivery regions ranged in population from 1,426,240 residents in the Central Coast region to more than 21 million residents in the Southern California region in 2010. The Southern California region is projected to continue to have a larger share of the Extended Study Area's future population at 59.6 percent (larger than all other regions combined). The proportion of the Bay Area and San Joaquin regional populations is expected to continue to be approximately the same as it has been in the past, at 27 percent (DOF, 2012a).

Table 22-2 also shows the average annual population growth rate in the water delivery regions for the periods from 2000 to 2010 and 2010 to 2030. Between 2000 and 2010, the population in the water delivery regions grew at an average annual rate of 1.01 percent. Among the five regions, the San Joaquin

region had the highest growth rate of 1.83 percent, and the Bay Area and the Central Coast regions had the smallest growth rate of 0.64 and 0.50 percent, respectively. The average annual population growth rate is expected to be highest in the San Joaquin region (2.51 percent) and lowest in the Bay Area and Central Coast regions (1.12 and 0.99, respectively) during the 2010 to 2030 period.

22.2.2.2 Economic Activity

Table 22-3 presents measures of economic activity within the Extended Study Area as of 2009. The 39 counties within the Extended Study Area produced approximately $1 trillion in total industry output and had a labor force of 16,623,040. The unemployment rate varied from 10.9 percent in the Bay Area region to 16.5 percent in the San Joaquin region.

Table 22-3
Economic Activity within the Extended Study Area and California in 2009 (2010 Dollars)

Water Delivery Region	Total Personal Income[a] (Thousand $)	Total Industry Output[b] (Thousand $)	Total Civilian Labor Force[c]	Unemployment Rate (%)
Bay Area	236,896,426	183,603,903	2,226,600	10.9
Central Coast	53,354,289	38,148,252	750,000	12.5
Sacramento Valley	126,584,666	86,712,892	1,517,730	14.9
San Joaquin	119,011,208	79,575,465	1,832,610	16.5
Southern California	855,026,941	627,362,787	10,296,100	14.6
Extended Study Area Total	1,390,873,530	1,015,403,299	16,623,040	13.9
California	1,566,999,086	1,145,167,947	18,176,200	12.4

[a]Total personal income is the sum of income received by all persons from all sources.

[b]Total industry output is the total production from all industries in a region for a given year.

[c]Total civilian labor force is the sum of all persons classified as employed.

Source: BEA, 2009.

22.2.2.3 Agricultural Activity

The average irrigated acreage and annual value of production for the five water delivery regions are listed in Table 22-4. The San Joaquin region had the most irrigated crops, in terms of acreage, at 5.6 million acres (approximately 60 percent of the total for the Extended Study Area). The San Joaquin region also had the largest production value of irrigated crops; livestock, dairy, and apiary; and dryland range with $15.6 billion, $8.4 billion, and $77 million, respectively. Of the water delivery regions, the area with the least agricultural production was the Bay Area region, with approximately 105,000 acres of irrigated crops (1.1 percent of the total acreage for the Extended Study Area). Agricultural production value for the Bay Area region was approximately $796 million for irrigated crops; $30 million for livestock, dairy, apiary; and $8.6 million for dryland range.

Table 22-4
Average Irrigated Acreage and Annual Value of Production (2008 to 2010) within the Extended Study Area (2010 Dollars)

Water Delivery Region	Irrigated Crops		Livestock, Dairy, Apiary	Dryland Range
	Acreage	Value (Thousand $)	Value (Thousand $)	Value (Thousand $)
Bay Area	104,914	796,113	30,107	8,620
Central Coast	683,524	6,366,796	161,108	29,586
Sacramento Valley	1,905,226	3,271,313	431,448	28,720
San Joaquin	5,600,756	15,603,416	8,429,888	77,341
Southern California	944,329	5,498,551	1,093,210	4,083
Extended Study Area Total	**9,238,750**	**31,536,188**	**10,145,761**	**148,350**
California	10,651,347	33,737,268	10,914,904	184,619

Sources: USDA, 2009, 2010, and 2011.

22.2.3 Secondary Study Area

The Secondary Study Area is comprised of 22 counties that are grouped into water delivery regions that use CVP water and could be affected by changes in operation and water delivery resulting from the alternatives (Table 22-5).

Table 22-5
Counties in Water Delivery Regions – Secondary Study Area

Water Delivery Region	Counties Included in the Water Delivery Region
Bay Area	Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara
Sacramento Valley	Butte, Colusa, El Dorado, Glenn, Placer, Sacramento, Shasta, Solano, Sonoma, Sutter, Tehama, Yolo, Yuba
North Coast	Del Norte, Humboldt, Trinity

22.2.3.1 Population

Historical, current, and projected population estimates for the three water delivery regions in the Secondary Study Area are summarized in Table 22-6. Historically, the Bay Area region had the highest population concentration, with approximately 63 percent of the total regional population in 2000. Approximately 35 percent of the population in the water delivery regions resides in the Sacramento Valley region. The population in the North Coast region accounts for approximately two percent of the overall regional population.

Table 22-6 also shows the average annual population growth rate in the water delivery regions for the periods from 2000 to 2010 and 2010 to 2030. Between 2000 and 2010, the population in the water delivery regions grew at an average annual rate of 0.82 percent. Among the three regions, the Sacramento Valley region had the highest growth rate of 1.35 percent, and the Bay Area and the North Coast regions had smaller growth rates of 0.52 and 0.58 percent, respectively. The average annual population growth

rate is expected to be highest in the Sacramento Valley region (1.61 percent) and lowest in the Bay Area and North Coast regions (0.90 percent) during the 2010 to 2030 period.

Table 22-6
Historical, Current, and Projected Population and Average Annual Growth Rate within the Secondary Study Area and California

Water Delivery Region	Population			Average Annual Growth Rate (%)	
	2000	2010	2030	2000 to 2010	2010 to 2030
Bay Area	5,806,325	6,117,033	7,320,957	0.52	0.90
Sacramento Valley	3,256,885	3,723,468	5,123,713	1.35	1.61
North Coast	167,047	177,019	211,773	0.58	0.90
Secondary Study Area Total	9,230,257	10,017,520	12,656,443	0.82	1.18
California	33,871,648	37,253,956	46,688,407	0.96	1.14

Source: DOF, 2012b.

22.2.3.2 Economic Activity

Table 22-7 presents measures of economic activity within the Secondary Study Area as of 2009. The 22 counties within the Secondary Study Area produced approximately $387 billion in total industry output and had a labor force of 4,939,210. The unemployment rate varied from a low of 10.5 percent in the Bay Area region to a high of 12.8 percent in the Sacramento Valley region. Agricultural economic activity is included in Table 22-7. Additional detail is not provided because impacts to agriculture are only modeled for the Extended Study Area.

Table 22-7
Economic Activity within the Secondary Study Area and California in 2009 (2010 Dollars)

Water Delivery Region	Total Personal Income[a] (Thousand $)	Total Industry Output[b] (Thousand $)	Total Civilian Labor Force[c]	Unemployment Rate (%)
Bay Area	358,592,983	285,948,210	3,114,000	10.5
Sacramento Valley	144,689,070	98,058,833	1,747,540	12.8
North Coast	5,401,584	3,098,813	77,670	12.2
Secondary Study Area Total	508,683,637	387,105,856	4,939,210	11.4
California	1,566,999,086	1,145,167,947	18,176,200	12.4

[a]Total personal income is the sum of income received by all persons from all sources.
[b]Total industry output is the total production from all industries in a region for a given year.
[c]Total civilian labor force is the sum of all persons classified as employed.

Source: BEA, 2009.

22.2.4 Primary Study Area

The section summarizes the existing socioeconomic conditions within the Primary Study Area. Socioeconomic conditions that are described for the Primary Study Area include population, housing, employment, labor force, income, fiscal resources, and agricultural economics. The agriculture sector is discussed in greater detail because of its widespread and substantial contributions to the regional economy.

The Primary Study Area is comprised of Colusa and Glenn counties. These two counties are primarily rural with low populations compared to the rest of the State. There are a few small incorporated cities and several unincorporated areas in these counties. Populations vary in the numerous communities, with populations ranging from a few hundred people (e.g., Elk Creek and Stonyford) to a few thousand people (e.g., Orland and Colusa). Surrounding these communities are farms, ranches, and orchards, most of which have residences associated with them that are not in a delineated community, but are socially tied to a community through general proximity or public services (e.g., school district boundaries and public service delivery areas).

Colusa County encompasses approximately 1,151 square miles. The County seat is the City of Colusa. The County has two incorporated cities (Colusa and Williams) and several unincorporated communities: Maxwell, Arbuckle, Stonyford, Princeton, Grimes, and Sites. As of the 2010 census, approximately 70.5 percent of Colusa County's population was 25 years of age or older and had graduated from high school, and approximately 11.7 percent of that population group had a Bachelor's degree or higher education (U.S. Census Bureau, 2012).

Glenn County is located directly north of Colusa County and encompasses 1,314 square miles. The county seat is the City of Willows. The County has two incorporated cities (Willows and Orland) as well as the unincorporated areas of Hamilton City and Elk Creek. As of the 2010 census, approximately 73.9 percent of Glenn County's population was 25 years of age or older and had graduated from high school, and approximately 16.2 percent of that population group had a Bachelor's degree or higher education (U.S. Census Bureau, 2012).

22.2.4.1 Population

The population density in the Primary Study Area is very low. The highest concentration of people is located in the few incorporated towns, and smaller population concentrations are located in the rural communities throughout the Primary Study Area. In addition, numerous residences associated with agricultural parcels are scattered throughout the two counties.

Table 22-8 lists the population and annual growth rate of both counties within the Primary Study Area for 2000, 2010, projections for 2030, the average annual growth rates from 2000 to 2010, and projected growth rate from 2010 to 2030. Population size has increased by approximately one percent per year throughout the Primary Study Area, increasing by approximately 4,300 people in 10 years from 2000 to 2010.

Table 22-8
Historical, Current, and Projected Population and Average Annual Growth Rate within the Primary Study Area and California

Area	2000	2010	2030	Average Annual Growth Rate 2000-2010 (%)	Average Annual Growth Rate 2010-2030 (%)
Glenn County	26,453	28,122	45,181	0.61	2.40
Colusa County	18,804	21,419	34,488	1.31	2.41
Primary Study Area Total	45,257	49,541	79,669	0.91	2.40
California	33,871,648	37,253,956	46,688,407	0.96	1.14

Source: U.S. Census Bureau, 2012.

Age distribution within the Primary Study Area's counties, compared to the State of California, as of 2010 is shown in Table 22-9. The working age population between ages 20 and 64 is approximately 27,500 people. School age children (ages 5 to 19), adults (ages 20 to 64), and senior citizens (ages 65 and older) represented approximately 24, 56, and 12.6 percent, respectively, of the total population in the Primary Study Area in 2010. This age composition is similar to that of the State.

Table 22-9
Age Distribution within the Primary Study Area Counties and California

Area	2010 Population (Number and Percent of Total)								
	Total	<5 years of age		5 to 19 years of age		20 to 64 years of age		65+ years of age	
		Number	%	Number	%	Number	%	Number	%
Colusa County	21,419	1,841	8.6	5,198	24.2	11,885	55.6	2,495	11.6
Glenn County	28,122	2,178	7.7	6,489	23.1	15,709	55.9	3,737	13.2
Primary Study Area Total	49,541	4,019	8.1	11,687	23.6	27,594	55.7	6,232	12.6
California	37,253,956	2,531,333	6.8	7,920,709	21.3	22,555,400	60.5	4,246,514	11.4

Source: U.S Census Bureau, 2012.

22.2.4.2 Housing

Table 22-10 shows the housing distribution, vacancy rates, and persons per household for the incorporated cities and unincorporated areas included in the counties that comprise the Primary Study Area. As of 2010, there were 27,544 housing units within the Primary Study Area, representing 0.2 percent of the housing units in the State. Of the two counties, Glenn County had the highest number of single-family and multi-family homes in 2010, with 11,548 single-family and 2,836 multi-family homes. Colusa County had 8,855 single-family and 1,688 multi-family homes in 2010. Glenn County had a vacancy rate of 7.73 percent and Colusa County had a vacancy rate of 7.12 percent.

Table 22-10
Housing Distribution within the Primary Study Area and California

County/City	Single-Family	Multiple-Family	Mobile Homes	Total Housing Units	Percent Vacant	Persons Per Household
Glenn County						
Incorporated Area						
Orland	2,045	581	71	2,697	5.15	2.92
Willows	1,657	768	8	2,433	9.82	2.88
Incorporated Area Subtotal	3,702	1,349	79	5,130	7.37	2.90
Unincorporated Area	4,144	138	1,480	5,762	8.59	2.90
Glenn County Total	**7,846**	**1,487**	**1,559**	**10,892**	**8.02**	**2.9**

Table 22-10
Housing Distribution within the Primary Study Area and California

County/City	Single-Family	Multiple-Family	Mobile Homes	Total Housing Units	Percent Vacant	Persons Per Household
Colusa County						
Incorporated Area						
Colusa	1,694	462	52	2,208	5.80	2.80
Williams	1,104	263	67	1,434	4.53	3.73
Incorporated Area Subtotal	2,798	725	119	3,642	5.30	3.18
Unincorporated Area	3,259	238	741	4,238	13.57	2.96
Colusa County Total	**6,057**	**963**	**860**	**7,880**	**9.747749**	**3.06168**
Primary Study Area Total	**13,903**	**2,450**	**2,419**	**18,772**	**8.74**	**2.97**
California	8,747,293	4,247,635	596,938	13,591,866	5.90	2.955

Source: DOF, 2012b.

In 2010, 45 building permits were issued in Glenn County, and 19 building permits were issued in Colusa County (U.S. Census Bureau, 2012).

In 2012, there were nine hotels and two campgrounds/RV parks in Colusa County, and 13 hotels and five campgrounds available in Glenn County (Google Maps, 2012).

22.2.4.3 Economic Activity

Employment and income provide useful insight into an area's economy. A community-level discussion is not provided because employment and income data are available only at the county level.

The Primary Study Area economy is rooted in agriculture. Agriculture became the primary economic driver in the region because of the rich soil, ample water supply, and proximity to urban markets. Today, the agricultural sector is still important in the Primary Study Area, but changes in mechanization and processing have resulted in a much smaller proportion of residents participating in agriculture than during the early part of the 20th century.

Table 22-11 presents measures of economic activity within the Primary Study Area as of 2009. The two counties within the Primary Study Area produced approximately $1.8 billion in total personal income and $1.2 billion in total industry output in 2009. The distribution of the regional personal income was approximately 51 percent and 49 percent for Glenn and Colusa counties, respectively. The distribution of regional earnings by industry was approximately 47 percent and 53 percent for Glenn and Colusa counties, respectively. The Primary Study Area's regional personal income and total industry earnings accounted for approximately one tenth of one percent of California's total personal income and total industry earnings.

Table 22-11
Personal Income and Industry Earnings within the Primary Study Area and California in 2009 (2010 Dollars)

Area	Total Personal Income in 2009 (Thousand $)	Earning by Industry in 2009 (Thousand $)
Glenn County	912,862	586,999
Colusa County	868,203	662,464
Primary Study Area Total	1,781,065	1,249,463
California	1,566,999,086	1,145,167,947

Source: BEA, 2009.

Table 22-12
Employment within the Primary Study Area and California in 2010

Area	Civilian Labor Force	Number of Civilians Employed	Unemployment Rate (%)
Glenn County	12,730	10,660	16.3
Colusa County	11,930	9,500	20.4
Primary Study Area Total	24,660	20,160	18.3
California	18,335,400	16,109,000	12.2

Source: EDD, 2012.

In 2010, the total labor force was 12,730 and 11,930 in Glenn and Colusa counties, respectively. During the same year, there were 18,335,400 people in California's labor force; thus, the labor force in the Primary Study Area comprises approximately 0.13 percent of the State's total labor force. The unemployment rates in 2010 were 16.3 percent for Glenn County and 20.4 percent for Colusa County. In comparison, in 2010, the California unemployment rate was 12.2 percent.

Table 22-13 provides Glenn County's employment by industry, employment share, and annual growth rates. The top three industries in Glenn County in 2010, as measured by the number of employees, were government, agriculture, and services. The retail industry had the highest annual growth rates (at 4.5 percent), followed by the services industry, which had a 1.8 percent annual growth rate. The manufacturing; natural resources, mining, and construction; financial activities, transportation, warehousing, and utilities; and government sectors all experienced negative annual growth rates during that 10-year period.

Table 22-13
Employment by Industry for the Primary Study Area – Glenn County

Industry	2000		2010		2000 to 2010	
	Number of Employees	Employment Share (%)	Number of Employees	Employment Share (%)	Change (%)	Average Annual Growth (%)
Agriculture	1,510	28.7	1,740	32.5	15.2	1.4
Natural Resources, Mining and Construction	320	6.1	260	4.9	-18.8	-2.1
Manufacturing	990	18.8	570	10.6	-42.4	-5.4

Table 22-13
Employment by Industry for the Primary Study Area – Glenn County

Industry	2000		2010		2000 to 2010	
	Number of Employees	Employment Share (%)	Number of Employees	Employment Share (%)	Change (%)	Average Annual Growth (%)
Wholesale	570	10.8	580	10.8	1.8	0.2
Retail	290	5.5	450	8.4	55.2	4.5
Transportation, Warehousing, and Utilities	180	3.4	170	3.2	-5.6	-0.6
Financial Activities	190	3.6	170	3.2	-10.5	-1.1
Services	1,110	21.1	1,330	24.8	19.8	1.8
Government	2,280	30.6	2,210	29.5	-3.1	-0.3
Total Industry Employment	**7,440**	**100.0**	**7,480**	**100**	**0.5**	**0.1**

Source: EDD, 2012.

Table 22-14 provides Colusa County's employment by industry, employment share, and annual growth rates. The top three industries in Colusa County in 2010, as measured by the number of employees, were agriculture, government, and services. The natural resources, mining, and construction industry had the highest annual growth rate (at 19.2 percent), followed by the wholesale industry, which had a 6.5 percent annual growth rate. The transportation, warehousing, and utilities; manufacturing; retail; and agriculture sectors all experienced negative annual growth rates during that 10-year period.

Table 22-14
Employment by Industry for the Primary Study Area – Colusa County

Industry	2000		2010		2000 to 2010	
	Number of Employees	Employment Share (%)	Number of Employees	Employment Share (%)	Change (%)	Average Annual Growth (%)
Agriculture	2,560	33.8	2,470	28.9	-3.5	-0.4
Natural Resources, Mining, and Construction	100	1.3	580	6.8	480.0	19.2
Manufacturing	870	11.5	760	8.9	-12.6	-1.3
Wholesale	320	4.2	600	7.0	87.5	6.5
Retail	520	6.9	480	5.6	-7.7	-0.8
Transportation, Warehousing, and Utilities	220	2.9	180	2.1	-18.2	-2.0
Financial Activities	180	2.4	180	2.1	0.0	0.0
Services	1,040	13.7	1,210	14.2	16.3	1.5
Government	1,770	23.4	2,090	24.4	18.1	1.7
Total Industry Employment	**7,580**	**100.0**	**8,550**	**100**	**12.8**	**1.2**

Source: EDD, 2012.

In total, the Primary Study Area's combined employment in 2000 and 2010 was 15,020 and 16,030, respectively, representing a 6.7 percent increase from 2000 to 2010.

The 2010 median household income in Colusa County was $48,016 and per capita income was $21,317 (Table 22-15). Both the median household income and per capita income were lower than for California. The percentage of persons below the poverty level, 15 percent, was slightly higher than for the State. Approximately 35.3 percent of the population was considered minority (U.S. Census Bureau, 2010).

Table 22-15
Demographics of the Primary Study Area – 2010

Demographic	Glenn County	Colusa County	California
Median household income	$43,074	$48,016	$60,883
Per capita income	$19,987	$21,317	$29,188
Percentage of persons below poverty level	17.5	15.0	13.7
Minority Population	8,132	7,565	15,800,022
Percent minority population	28.9	35.3	42.4

Source: U.S. Census Bureau, 2010.

The 2010_median household income in Glenn County was $43,074 and per capita income was $19,987 (Table 22-15). Both the median household income and per capita income were lower than for California. The percentage of persons below the poverty level was 17.5 percent, which was higher than for the State. Approximately 28.9 percent of the population was considered minority (U.S. Census Bureau, 2010). The population of the Primary Study Area is relatively ethnically diverse as a result of its unique cultural history, the presence of seasonal farm workers, and agricultural past.

22.2.4.4 County Budgets

Glenn and Colusa counties are the local agencies that have taxing authority for the Primary Study Area. Revenues from property taxes are used to fund county governments, local school districts, county roads, local fire departments, libraries, and emergency medical services.

Table 22-16 presents historical and current general fund revenues and expenditures (2008 to 2012) for Glenn County. As shown, the expenditures exceeded revenues in 2010 and 2011, and are expected to exceed revenues in 2012. The majority of the general fund revenues for 2008 to 2012 were from intergovernmental transfers and other financing sources. Taxes ranged from approximately 6.5 percent in 2012 to 13.8 percent in 2009.

Table 22-16
Glenn County General Fund Revenues and Expenditures

	FY 2008 Actual (Thousand $)	FY 2009 Actual (Thousand $)	FY 2010 Actual (Thousand $)	FY 2011 Actual (Thousand $)	FY 2012 Adopted (Thousand $)
Revenues by Source					
Taxes	9,842	10,004	5,614	5,527	5,621
Licenses and Permits	1,109	1,078	1,053	1,004	1,084
Fines, Forfeitures and Penalties	1,456	1,536	1,353	1,368	1,460

Table 22-16
Glenn County General Fund Revenues and Expenditures

	FY 2008 Actual (Thousand $)	FY 2009 Actual (Thousand $)	FY 2010 Actual (Thousand $)	FY 2011 Actual (Thousand $)	FY 2012 Adopted (Thousand $)
Use of Money & Property	616	325	122	144	127
Intergovernmental Transfers	39,319	38,784	42,016	39,095	56,009
Charges for Services	7,571	7,508	8,559	797	6,981
Miscellaneous	2,005	1,148	775	828	876
Other Financing Sources	11,341	12,128	12,091	10,898	13,690
Special Items	N/A	N/A	560	683	446
Total Revenues	**73,259**	**72,511**	**72,143**	**60,344**	**86,293**
Expenditures by Function					
General Government	17,303	16,879	16,297	13,894	16,295
Public Protection	20,770	19,580	18,796	18,014	19,458
Public Ways and Facilities	3,664	4,517	4,594	4,944	16,087
Health and Sanitation	14,124	13,952	14,611	14,344	15,512
Public Assistance	16,097	16,563	16,405	16,333	19,608
Education	563	564	539	536	542
Debt Service	421	407	219	205	220
Contingency	N/A	N/A	N/A	170	200
Reserves	N/A	N/A	2,743	1,747	267
Total Expenditures	**72,941**	**72,461**	**74,204**	**70,189**	**88,190**

Notes
FY = Fiscal Year
NA = Not reported
Source: Glenn County, 2012.

Table 22-17 presents historical and current general fund revenues and expenditures for Colusa County. As shown, revenues exceeded expenditures in 2008, 2009, and 2010; expenditures exceeded revenues in 2011; and are expected to exceed revenues in 2012. The majority of the general fund revenues from 2008 to 2012 were from intergovernmental transfers and other revenues. Taxes ranged from approximately 15.8 percent in 2008 to 28.2 percent in 2012.

Table 22-17
Colusa County General Fund Revenues and Expenditures

	FY 2008 Actual (Thousand $)	FY 2009 Actual (Thousand $)	FY 2010 Actual (Thousand $)	FY 2011 Actual (Thousand $)	FY 2012 Adopted (Thousand $)
Revenues by Source					
Taxes	11,613	12,645	13,807	12,485	17,163
Licenses and Permits	1,109	1,048	1,024	1,133	975
Fines and Forfeitures	1,364	1,146	1,385	1,727	1,525
Use of Money and Property	1,028	790	1,037	447	520
Intergovernmental Revenues	31,046	24,191	25,120	26,029	23,764
Charges for Services	2,571	2,359	2,012	2,030	1,664

Table 22-17
Colusa County General Fund Revenues and Expenditures

	FY 2008 Actual (Thousand $)	FY 2009 Actual (Thousand $)	FY 2010 Actual (Thousand $)	FY 2011 Actual (Thousand $)	FY 2012 Adopted (Thousand $)
Other Revenues	24,544	20,984	16,494	14,298	15,183
Total Revenues	**73,275**	**63,164**	**60,878**	**58,148**	**60,793**
Expenditures by Function					
General Government	9,243	9,059	4,045	9,543	4,799
Public Protection	17,056	17,892	17,261	16,583	17,487
Public Ways and Facilities	16,520	7,845	6,429	12,692	8,742
Health and Sanitation	11,392	11,435	12,410	12,744	12,954
Public Assistance	14,996	15,589	15,343	17,558	17,268
Education	889	920	953	933	1,076
Recreation and Culture	249	361	129	211	142
Total Expenditures	**70,346**	**63,101**	**56,571**	**70,265**	**62,467**

Note:
FY = Fiscal Year
Source: Colusa County, 2012

In total, adopted county general fund revenues and expenditures in 2012 for the Primary Study Area were $147,085,576 and $150,657,602, respectively.

22.2.4.5 Agricultural Economics in the Primary Study Area

Agriculture is a major industry in the Primary Study Area. Major commodities include rice, almonds, dairies, walnuts, and prunes. The total value of production for Glenn County irrigated crops, dryland range, livestock, dairy, and apiary was $520 million per year from 2008 to 2010 (Table 22-18). Rice was the top irrigated crop in terms of acreage harvested, tons produced, and production value. Almonds were the next most valuable crop with a value of production that was slightly less than half the production value of rice.

Table 22-18
Glenn County Average Agricultural Production, 2008 to 2010 (2010 Dollars)

Crop	Harvested Acreage	Production (tons)	Value per acre ($)	Value of Production (Thousand $)
Top Six Irrigated Crops				
Rice	85,154	376,441	2,045	174,133
Almonds	31,097	5,686	2,966	92,236
Walnuts	14,831	28,599	3,113	46,165
Plums, Dried	6,676	14,983	3,363	22,454
Olives	5,781	18,388	2,732	15,794
Alfalfa Hay	16,301	110,934	893	14,549
Other Irrigated Crops				
Other Field, Forage, Miscellaneous	47,315		957	45,295

Table 22-18
Glenn County Average Agricultural Production, 2008 to 2010 (2010 Dollars)

Crop	Harvested Acreage	Production (tons)	Value per acre ($)	Value of Production (Thousand $)
Other Fruit and Nut	2,589		4,697	12,162
Other Vegetables, Nursery	2,664		2,084	5,554
Total Irrigated Crops	212,409		2,017	428,343
Dryland Range	230,000		6.75	1,553
Livestock, Dairy, Apiary				90,110
Total All				**520,006**

Source: USDA 2009, 2010 and 2011

Agriculture is also a leading industry in Colusa County. The total value of production for Colusa County irrigated crops, dryland range, livestock, dairy, and apiary averaged over $637.5 million per year from 2008 to 2010 (Table 22-19). Rice was the top irrigated crop in terms of acreage harvested, tons produced, and production value. Almonds were the next most valuable crop with a value of production that was approximately 43.7 percent of the production of rice.

Table 22-19
Colusa County Average Agricultural Production, 2008 to 2010 (2010 Dollars)

Crop	Harvested Acreage	Production (tons)	Value per acre ($)	Value of Production (Thousand $)
Top Six Irrigated Crops				
Rice	162,160	696,952	1,926	312,392
Almonds	37,403	40,643	3,653	136,638
Walnuts	14,727	679,548	3,487	51,350
Plums, Dried	6,050	10,378	2,626	15,885
Olives	22,600	61,814	568	12,827
Alfalfa Hay	12,267	91,483	986	12,100
Other Irrigated Crops				
Other Field, Forage, Miscellaneous	10,605		3670.29	38,923
Other Fruit and Nut	18,992		1,029	19,544
Other Vegetables, Nursery	4,950		3,634	17,986
Total Irrigated Crops	289,753		2,132	617,645
Dryland Range	183,333		10.12	1,856
Livestock, Dairy, Apiary				18,070
Total All				**637,571**

Source: USDA 2009, 2010 and 2011.

In total, the average irrigated crop acreage from 2008 to 2010 in the Primary Study Area was 502,162, with an average value per acre of $2,083.

22.3 Environmental Impacts/Environmental Consequences

22.3.1 Regulatory Setting

Socioeconomic resources are regulated at the federal, State, and local levels through goals and policies that regulate population growth, housing development, relocation assistance, and industry creation. Provided below is a list of the applicable regulations. These regulations are discussed in detail in Chapter 4 Environmental Compliance and Permit Summary of this EIR/EIS.

22.3.1.1 Federal Plans, Policies, and Regulations

- Constitution of the United States: Fifth Amendment Takings Clause
- Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970
- Housing and Community Development Act of 1974
- U.S. Department of Agriculture Commodity Programs, Conservation Reserve and Wetland Reserve Programs, Marketing and Credit Assistance, and Crop Insurance and Disaster Assistance

22.3.1.2 State Plans, Policies, and Regulations

- California Constitution: Article 1 Declaration of Rights, Section 19
- California Relocation Assistance Act and the California Relocation Assistance and Real Property Acquisition Guidelines

22.3.1.3 Regional and Local Plans, Policies, and Regulations

- Glenn County General Plan
- Colusa County General Plan

22.3.2 Evaluation Criteria and Significance Thresholds

Significance criteria represent the thresholds that were used to identify whether an impact would be significant. Appendix G of the *CEQA Guidelines* suggests the following evaluation criteria for population and housing:

Would the Project:

- Induce substantial population growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extensions of roads or other infrastructure)?
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

The evaluation criteria used for this impact analysis represent a combination of the Appendix G criteria and professional judgment that considers current regulations, standards, and/or consultation with agencies, knowledge of the area, and the context and intensity of the environmental effects, as required pursuant to NEPA. For the purposes of this analysis, an alternative would result in a significant impact if it would result in any of the following:

- Substantial adverse effects on regional economics.
- Substantial adverse effects on population and housing.

- Substantial adverse effects on local government fiscal conditions.
- Substantial adverse effects on recreation economics.
- Substantial adverse effects on agricultural economics.
- Substantial adverse effects on municipal and industrial (M&I) water use economics.

The determination of impact significance is based on the magnitude of socioeconomic effects that the Project would cause.

- **No impact** indicates no change in socioeconomic conditions would occur.
- A **less-than-significant impact** may or may not be perceptible but is considered a minor (less than five percent) change in socioeconomic conditions.

A **significant impact** with feasible mitigation may be reduced to less-than-significant levels or avoided. Without mitigation measures, a significant impact would cause a major (greater than five percent) change in socioeconomic conditions.

22.3.3 Impact Assessment Assumptions and Methodology

22.3.3.1 Assumptions

The following assumptions were made regarding Project-related construction, operation, and maintenance impacts to socioeconomics:

- Direct Project-related construction, operation, and maintenance activities would occur in the Primary Study Area.
- Direct Project-related operational effects would occur in the Secondary Study Area.
- The only direct Project-related construction activity that would occur in the Secondary Study Area is the installation of an additional pump into an existing bay at the Red Bluff Pumping Plant.
- The only direct Project-related maintenance activity that would occur in the Secondary Study Area is the sediment removal and disposal at the two intake locations (i.e., GCID Canal Intake and Red Bluff Pumping Plant).
- No direct Project-related construction or maintenance activities would occur in the Extended Study Area.
- Direct Project-related operational effects that would occur in the Extended Study Area are related to San Luis Reservoir operation; increased reliability of water supply to agricultural, municipal, and industrial water users; and the provision of an alternate Level 4 refuge water supply. Indirect effects to the operation of certain facilities that are located in the Extended Study Area, and indirect effects to the consequent water deliveries made by those facilities, would occur as a result of implementing the alternatives.
- No additional channel stabilization, grade control measures, or dredging in the Sacramento River at or upstream of the Delevan Pipeline Intake/Discharge facilities would be required.
- Although the size of the regional economy would likely grow, when comparing Existing Conditions and the No Project/No Action Alternative, Alternative A, Alternative B, and Alternative C, it is assumed that the type of industries and spending patterns by consumers, as examples, would not.

22.3.3.2 Methodology

Part of the socioeconomic analysis is based upon results of hydrologic and water quality analytical model simulations of the Project alternatives, Existing Conditions, and the No Project/No Action Alternative. Operation of Alternatives A, B, and C was analyzed for future conditions that would occur in approximately year 2025. Costs used in the impacts assessment are reported in 2010 dollars (U.S. Department of Commerce, 2012).

The CEQA analysis presents the results of the comparison of socioeconomic conditions associated with construction and operation of Alternatives A, B, and C to those of Existing Conditions. Many of the differences between Alternatives A, B, C, and Existing Conditions are related to the changes that would occur due to assumptions related to the socioeconomic models (such as population growth) and are unrelated to Alternatives A, B, and C. The CEQA analysis also presents the results of a comparison of the No Project/No Action Alternative and Existing Conditions.

The NEPA analysis presents the results of the comparison of socioeconomics conditions associated with operation of Alternatives A, B, and C to those of the No Project/No Action Alternative. In accordance with NEPA, the No Project/No Action Alternative represents the reasonably foreseeable future conditions that may occur if the alternatives are not approved; the future No Project/No Action Alternative conditions include several projects and programs (refer to Chapter 3 Description of Proposed Project//Proposed Action and Alternatives for details). It is important that the No Project/No Action Alternative assumptions are not speculative to avoid causing the results of the impact assessment to misrepresent either the impacts or benefits of the alternatives.

Although Appendix G of the *CEQA Guidelines* indicates that "economic or social effects of a project shall not be treated as significant effects on the environment", economic and social effects are included in this Draft EIR/EIS for "determining the significance of physical changes caused by the project". Although significance criteria were applied to the Project-related socioeconomic effects, the physical effects related to the socioeconomic effects were addressed in other chapters of this EIR/EIS. Chapters that address the Project-related physical effects related to the economic and social effects include: Chapter 6 Surface Water Resources, Chapter 7 Surface Water Quality, Chapter 20 Land Use, Chapter 21 Recreation Resources, and Chapter 29 Public Services and Utilities.

This chapter addresses the Project-related socioeconomic effects in relation to:

- Regional economics
- Population and housing
- Local government fiscal conditions
- Recreation economics
- Agricultural economics
- M&I water use economics

The Secondary Study Area is defined as the area of potential operational effects, including SWP and CVP facilities that could experience reservoir water surface elevation fluctuations and stream flow changes downstream from their facilities. These operational effects are included in the analysis of the Extended Study Area. Therefore, no separate impact analyses were undertaken for the economic or social effects of the No Project/No Action Alternative in the Secondary Study Area.

For a summary of the economics analytical framework used for this analysis, see Appendix 22A. Economics model results used in this analysis are included in Appendix 22B.

Regional Economics

Regional economic effects include changes in characteristics such as regional employment and income. The magnitude of the economic effects depends on the initial changes in economic activity within the region (such as construction expenditure or loss of production from existing activities), the interactions within the regional economy, and the "leakage" of economic activity from this regional economy to the larger surrounding economy. Economic linkages create multiplier effects in a regional economy as money is circulated by trade. These linkages are often modeled using large mathematical input-output models such as IMPLAN. IMPLAN, a computer database and modeling system used to create regional economics models for any combination of United States counties, is used in this analysis. For a detailed description of IMPLAN, see Appendix 22C.

An IMPLAN model of the Primary Study Area was used to estimate total changes in employment and income as a result of Project construction and operation, a reduction in temporary and permanent agricultural production, and changes in land use and recreation. Although the size of the economy would change across economic conditions, the structure of the economy would not. The IMPLAN model uses the structural relationship between elements of the economy to identify Project-related socioeconomic impacts. When evaluating temporary impacts, such as Project construction, it is likely that no structural change would occur in the relationship between elements of the economy. Although long-term impacts may incite structural changes, the relatively small Project operation and maintenance impact would not likely do so. Therefore, with no expected change in the structure of the economy across conditions, the Existing Conditions and No Project/No Action Alternative IMPLAN models are the same.

An IMPLAN model was also created for the multi-county Extended Study Area and was used to estimate total changes in employment and income. Changes in employment and income in this study area could result from changes in agricultural production as a result of the operation of the Project. Changes in employment and income in the Secondary Study Area were evaluated as part of the Extended Study Area IMPLAN model. However, Secondary Study Area impacts to employment and income are not reported independent of the Extended Study Area results.

Population and Housing

Estimates of housing demand, both during the construction and operation phases for each alternative, were calculated based on changes in employment that would result from implementation of the Project. The Project is expected to draw from the entire workforce in the Primary Study Area, not merely those workers who are available in the immediate area of construction or operation activity. It is expected that some portion of the construction and operation workforce would be filled by workers in the Primary Study Area who would not demand new housing. However, construction and operation would require specialty occupations that require skills that are not likely available in the local workforce. Thus, out-of-region contractors may import crews to the Project area. These workers may immigrate from outside the Primary Study Area and demand additional housing. Because of the likelihood that specialized occupations and out-of-region contractors would immigrate to the region, it is expected that additional housing demand would occur in the Primary Study Area. The proportion of construction and operation employees that would be locally supplied from within the Primary Study Area was determined through consultations with the engineering staff who developed Project cost estimates.

The estimates of housing demand increases were compared to the Primary Study Area real estate vacancy rates and availability of temporary lodging to assess whether capacity exists in the area to support

additional demand for temporary (during construction) and long-term (during operation) housing as a result of the Project.

Total estimated changes in population as a result of the Project were calculated by multiplying the average number of persons per household (DOF, 2012b) by the average number of workers anticipated to be needed for the Project using the results of the Primary Study Area IMPLAN analysis. As with the IMPLAN analysis, the impact assessment is based on the change in conditions, with Existing Conditions and No Project/No Action Alternative considered the same condition. Population changes were assessed for the short-term construction phase and for the longer-term operation phase. The changes in population resulting from construction and operation of an alternative were then compared to the projected population. In instances where population changes are anticipated to deviate from the historical annual average for the Primary Study Area (2000 to 2010), an impact was identified and discussed.

Local Government Fiscal Conditions

Fiscal effects on local governments would occur from changes to property tax revenue resulting from Project-related land acquisition. The fiscal impact analysis evaluated the estimated loss of property tax revenue resulting from potential conversion of existing land uses. An alternative would result in changes to existing land use that, in turn, would affect the property taxes on affected parcels. Tax rolls and redemption rolls were acquired for lands in the footprint of the alternatives and for the Project Buffer. Each county's tax roll dataset includes an itemization of county and special assessment related taxes. A GIS analysis identified affected parcels and associated property taxes using the tax roll data and parcel boundary information. For the purposes of this analysis, the entire affected parcel is expected to be acquired if it is located in the Project facility footprint. The total annual change in tax revenue associated with the affected parcels was then calculated for each taxing entity for each alternative. As with the IMPLAN analysis, the impact assessment is based on the change in conditions, with Existing Conditions and No Project/No Action Alternative considered the same condition.

Recreational Economics

Recreational economic effects in the Primary Study Area would occur from a change in recreational expenditures. It is expected that recreation visitation and expenditures would increase within the Primary Study Area as a result of increased recreation and visitors drawn from other recreational sites. It is anticipated that recreational numbers and patterns would be similar to those of nearby facilities of similar character, specifically Black Butte Reservoir. Recreation visitation is only a function of reservoir water levels and not adjusted for population growth. Informational surveys completed at Black Butte Reservoir were used to estimate the mix of recreational activities at the proposed Sites Reservoir, type of recreational spending that would occur, and the percentage of expenditures originating outside the Primary Study Area (within approximately 60 miles) (Reclamation, 2012). As with the IMPLAN analysis, the impact assessment is based on the change in conditions, with Existing Conditions and No Project/No Action Alternative considered the same condition. The change in recreation expenditures in the Primary Study Area was used in the Primary Study Area IMPLAN model to identify changes in employment and income.

Agricultural Economics

The analysis of the economic effect of land use changes in the Primary Study Area is based on the changes in acreage resulting from the Project facilities' construction and operation. Quantitative estimates

were also made of the change in the value of agricultural production. Estimates were based on the acreage changes and the per-acre crop revenue summarized in Section 22.2.

The economic analysis of changes in agricultural production in the Extended Study Area used results from changes in SWP and CVP water delivery and changes in water quality. See Appendix 22F for an overview of the analytical approach. Changes in agricultural production in the Secondary Study Area are included in the Extended Study Area results.

Agricultural economic effects from changes in SWP and CVP water delivery were evaluated using the Statewide Agricultural Production (SWAP) model, a regional agricultural production model developed specifically for large-scale analysis of agricultural water supply and cost changes. SWAP is a regional model of irrigated agricultural production and economics that simulates the decisions of agricultural producers (i.e., farmers) in California. The model assumes that farmers maximize profit subject to available resource and economic conditions. Within this framework, the model estimates changes in acreage, crop production, and revenues resulting from changes in CVP and SWP water delivery. For a detailed description of SWAP see Appendix 22F.

Water quality effects were evaluated using a separate analysis of costs associated with managing salts in irrigation water. The economic effects of changes in water quality of irrigation water are complex and may occur in the short term and over the long term. Immediate effects of an improvement in salinity can include reduced quantity of water needed for leaching and subsequent irrigation costs, lower soil salinity, improved crop yields, and greater crop selection. Long-term effects are important in drainage-affected areas of the western and southern San Joaquin. A calculation of the value of changes in leaching requirement was used to illustrate the relative magnitude of short-term economic changes associated with salinity. The long-term value of salinity changes depends upon complex interactions among irrigation management, crop selection, and groundwater conditions. Because of this complexity, this long-term effect was described but not quantified.

Municipal and Industrial Water Use Economics

The economic analysis of changes in M&I water supply and quality in the Extended Study Area used results from changes in SWP and CVP water delivery and changes in salinity levels. See Appendix 22D and 22E for an overview of the analytical approach. Changes in M&I water supply and quality in the Secondary Study Area are included in the Extended Study Area results.

M&I water supply economic effects from changes in SWP and CVP water delivery were evaluated using the Least Cost Planning Simulation Model (LCPSIM) and the Other Municipal Water Economics Model (OMWEM). These models were developed by DWR for use in planning and impact studies related to water supply for SWP and CVP. LCPSIM was used to estimate the direct economic effect of changes in the water supply for M&I purposes in the urban areas of the San Francisco Bay – South and the South Coast hydrologic regions (refer to Chapter 7 Surface Water Quality for a description of California's hydrologic regions). Other affected SWP and CVP delivery regions were modeled using OMWEM. System-related energy costs are included in the assessment of M&I water use economics impacts from changes in SWP and CVP water deliveries and resulting changes in regional water portfolio management. However, the assessment of power- and energy-related impacts is discussed in Chapter 31 Power Production and Energy.

LCPSIM is an annual time-step urban water service system reliability management model. Its objective is to estimate the least-cost water supply management strategy for an area, given the mix of available

supplies, and considering the costs of new supply augmentation and use reduction options and the costs of water shortages. OMWEM is a set of individual spreadsheet models that were used to estimate economic benefits of changes in SWP or CVP supplies based on estimated water supply and demand conditions. For a detailed description of LCPSIM and OMWEM see Appendix 22D.

For the M&I water quality assessment, two models corresponding to two regions of M&I water users were used. The Lower Colorado River Basin Water Quality Model (LCRBWQM) covers almost the entire urban coastal region of southern California. LCRBWQM was developed by Reclamation and Metropolitan Water District of Southern California for assessing regional effects of salinity. The Bay Area Water Quality Economics Model (BAWQM) includes the portion of the Bay Area region from Contra Costa County south to Santa Clara County. The model uses estimated relationships between salinity and residential damages to estimate the benefits from changes in salinity. For a detailed description of LCRBWQM and BAWQM see Appendix 22E. Note that water quality impacts are a function of water quality and total volume of SWP and CVP deliveries. This is a result of blending of SWP and CVP deliveries that occurs with other imported and local water supply in a region.

22.3.4 Topics Eliminated from Further Analytical Consideration

This EIR/EIS does not address the Project-related socioeconomic effect of flood control, biological-related resources, and power production and energy. The socioeconomic effects of flood control and biological related resources were not included in this chapter because no direct socioeconomic-related impacts have been estimated. This is, in part, due to the limited Project-related flood control socioeconomic benefits and the indirect methods used to estimate the socioeconomic benefits of biological resources (Reclamation, 2012). Project-related effects of power production and energy are included in other socioeconomic impact discussions, such as M&I water use economics. Specifically, water supply costs in LCPSIM account for the power production required to convey water to the San Francisco Bay – South and the South Coast regions.

22.3.5 Impacts Associated with the No Project/No Action Alternative

22.3.5.1 Extended Study Area – No Project/No Action Alternative

Construction, Operation, and Maintenance Impacts

Hydrologic Regions, Water Delivery Regions, and Water Delivery Service Areas

Impact Socio-1: Substantial Adverse Effects on Regional Economics

The No Project/No Action Alternative assumes implementation of projects and programs being constructed, or those that have gained approval, as of June 2009. The impacts of these projects have already been evaluated on a project-by-project basis, pursuant to CEQA and/or NEPA, and their potential to exceed established standards has been addressed in those environmental documents. Therefore, **there would not be a substantial adverse effect** on regional economics, when compared to Existing Conditions.

Population growth is expected to occur in California throughout the period of Project analysis (i.e., 100 years), and is included in the assumptions for the No Project/No Action Alternative. A larger population could be expected to change the scale of the economy, increasing overall production in the Extended Study Area, when compared to Existing Conditions, but not its structure. Therefore, **there would not be a substantial adverse effect,** when compared to Existing Conditions.

Impact Socio-2: Substantial Adverse Effects on Population and Housing

It is anticipated that population growth in the Extended Study Area would follow the projections described for Existing Conditions if the No Project/No Action Alternative is implemented. Trends in housing demand and supply correspond to population trends. It is, therefore, expected that the growth in housing would match the growth in population. Therefore, **there would not be a substantial adverse effect** on population and housing, when compared to Existing Conditions.

Impact Socio-3: Substantial Adverse Effects on Local Government Fiscal Conditions

The No Project/No Action Alternative assumes implementation of projects and programs being constructed, or those that have gained approval, as of June 2009. The impacts of these projects have already been evaluated on a project-by-project basis, pursuant to CEQA and/or NEPA, and their potential to exceed established standards has been addressed in those environmental documents. Therefore, **there would not be a substantial adverse effect** on local government fiscal conditions, when compared to Existing Conditions.

Population growth is expected to occur in California throughout the period of Project analysis (i.e., 100 years), and is included in the assumptions for the No Project/No Action Alternative. A larger population could be expected to change the scale of the economy, increasing overall production in the Extended Study Area, when compared to Existing Conditions, but not its structure. Therefore, **there would not be a substantial adverse effect,** when compared to Existing Conditions.

Impact Socio-4: Substantial Adverse Effects on Recreation Economics

It is anticipated that, if the No Project/Action Alternative is implemented, recreation expenditure patterns in the Extended Study Area would be similar to those described for Existing Conditions. Growth in population is expected to cause growth in recreation economic activity. However, although the scale of recreation economic activity would increase with population growth, the structure of recreation economic activity would not. Therefore, **there would not be a substantial adverse effect** on recreation economics, when compared to Existing Conditions.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Table 22-20 summarizes irrigated crop acreage and value of agricultural production in the Extended Study Area if the No Project/Action Alternative is implemented, and shows the difference from Existing Conditions. These SWAP model results rely on water deliveries. Results are summarized for long-term and Dry and Critical water year average conditions. Agricultural markets are regional phenomena, so all irrigated crop lands in the Sacramento Valley are included, not just those of SWP and CVP contractors. Changes in crop acreage and value would occur over time in the Extended Study Area regardless of whether the Project is implemented. These changes primarily reflect trends in land use patterns, crop mix, and demands for agricultural products.

In the Extended Study Area, with implementation of the No Project/No Action Alternative, nearly $22 billion in crop value would be generated on approximately 7.5 million irrigated acres. Acreage and value of production would be slightly lower under a Dry and Critical water year average condition than long-term water year average condition as a result of lower water deliveries. This level of production is similar to Existing Conditions, and when comparing the No Project/No Action Alternative to Existing Conditions, the change in total irrigated acres would be negligible. However, the increase in demand and subsequent real price of agricultural output for the No Project/No Action Alternative, when compared to

Existing Conditions, would increase the total value of production, where the value of production is calculated by multiplying price by quantity. Because the Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average, no comparison is made with the No Project/No Action Alternative.

Table 22-20
Comparison of Crop Acres and Value of Agricultural Production for the No Project/No Action Alternative and Existing Conditions

Analysis Metric	No Project/No Action Alternative	Change from Existing Conditions
Long-Term Water Year Average		
Total Irrigated Acreage (Thousand Acres)	**7,484**	**-22**
Sacramento Valley[a]	1,907	2
San Joaquin[a]	5,577	-24
Total Value of Production (Million $)	**21, 996.5**	**3,121.8**
Sacramento Valley	3,711.3	440.0
San Joaquin	18,285.2	2,681.8
Dry and Critical Water Year Average[b]		
Total Irrigated Acreage (Thousand Acres)	**7,453**	**N/A**
Sacramento Valley	1,899	N/A
San Joaquin	5,554	N/A
Total Value of Production (Million $)	**21,995.1**	**N/A**
Sacramento Valley	3,696.1	N/A
San Joaquin	18,299.0	N/A

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions.

Notes:

N/A = Not Applicable
SWAP included relevant regions of agricultural production in the Extended Study Area
Value of production is based on prices received by farmers, in 2010 dollars.

Agricultural economic conditions that are not based on results of the SWAP model are included in the M&I Water Use Economics analysis presented in **Impact Socio-6**. These agricultural areas outside of the SWAP model include SWP water used for irrigation in the Central Coast and South Coast hydrologic regions, and CVP irrigation water delivery in the San Felipe Unit of San Benito and Santa Clara counties.

Agricultural production costs and investments per acre in the Extended Study Area for the No Project/No Action Alternative would be similar to those described for Existing Conditions. Salinity levels of irrigation water delivered to SWP and CVP export service areas in the Extended Study Area for the No Project/No Action Alternative would be similar to that described for Existing Conditions (refer to Chapter 7 Surface Water Quality (electrical conductivity levels) Section 7.3.6.1 for detailed analysis). No additional salinity related costs would be imposed on agricultural lands.

Table 22-21 summarizes the volume and cost of groundwater pumped in the Extended Study Area for the No Project/No Action Alternative, and shows the difference from Existing Conditions. More than 6.5 million acre-feet of groundwater would be pumped under long-term water year average conditions for irrigation purposes, at an estimated cost of more than $700 million per year. The volume and cost of groundwater pumping would increase slightly in Dry and Critical water year average conditions, as a

result of reduced surface water delivery to growers, if the No Project/No Action Alternative is implemented. When comparing the No Project/No Action Alternative to Existing Conditions, the reduction in groundwater pumping is a result of increased surface water deliveries and real price of groundwater pumping. The increase in the real price of groundwater pumping would increase the total cost of pumping, prompting producers to use other supplies. However, the No Project/No Action Alternative groundwater pumping could still lead to overdraft, adversely affecting and groundwater quality. Because the Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average, no comparison is made with the No Project/No Action Alternative.

Table 22-21
Comparison of Volume and Cost of Groundwater Pumping for the No Project/No Action Alternative and Existing Conditions

Analysis Metric	No Project/No Action Alternative	Change from Existing Conditions
Long-Term Water Year Average		
Annual Groundwater Pumped (TAF)	**6,556.5**	**-411.7**
Sacramento Valley[a]	1,405.1	-123.4
San Joaquina	5,151.4	-288.3
Annual Cost of Pumping (Million $)	**701.6**	**104.6**
Sacramento Valley	117.0	13.1
San Joaquin	584.6	91.5
Dry and Critical Water Year Average[b]		
Annual Groundwater Pumped (TAF)	**7,215.9**	**N/A**
Sacramento Valley	1,431.0	N/A
San Joaquin	5,784.9	N/A
Annual Cost of Pumping (Million $)	**788.0**	**N/A**
Sacramento Valley	118.7	N/A
San Joaquin	669.3	N/A

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions.

Notes:

N/A = Not Applicable
TAF = thousand acre feet

SWAP includes all relevant regions of agricultural production in the Extended Study Area grouped as Sacramento Valley and San Joaquin

Costs are presented in 2010 dollars.

A change in demand and subsequent real price of agricultural commodities, and the cost of inputs in the agricultural production process, specifically energy prices, are the primary reasons for the increase in the value of agricultural production and cost of groundwater pumping, respectively. However, these changes would be gradual and are offsetting. The relative size of the agricultural economy would not change significantly. Therefore, **there would not be a substantial adverse effect** on agricultural economics, when compared to Existing Conditions.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

The water supply conditions in the Extended Study Area for the No Project/No Action Alternative are discussed in Chapter 6 Surface Water Resources. This discussion focuses on the delivered M&I water supply specific to urban areas with modeled water supply costs. The segmentation of M&I water supply regions within the Extended Study Area is based on past M&I water supply economics models.

The No Project/No Action Alternative water deliveries, other water supply, and total supply costs, including management options (the sum of modeled conservation, recycling, and desalination) are reported for the San Francisco Bay – South hydrologic region for long-term and Dry and Critical water year average conditions, including changes from Existing Conditions, in Table 22-22. These changes would occur in the Bay Area subregion of the Extended Study Area.

When comparing the No Project/No Action Alternative to Existing Conditions, total water supply and costs would increase. The increase in water management options and other supply reflect the adoption of management options and transfers to meet increased demand for the No Project/No Action Alternative. Although shortages costs would decrease, the increase in total cost is expected with increased water supply costs, such as the increase in the real price of energy.

Table 22-22
Comparison of M&I Water Supply Deliveries and Costs for the San Francisco Bay-South Hydrologic Region for the No Project/No Action Alternative and Existing Conditions

Analysis Metric	No Project/No Action Alternative	Change from Existing Conditions
Long-Term Water Year Average		
Total Supply (TAF/Year)	**1,253**	**72**
Project Delivery	426	40
Management Options[a]	10	10
Other Supply	817	22
Total Costs (Million$/Year)	**207,871**	**37,918**
Shortage	5,478	-5,152
Supply[c]	202,394	43,070
Dry and Critical Water Year Average[b]		
Total Supply (TAF/Year)	**1,166**	**89**
Project Delivery	378.8	25
Management Options[a]	10	10
Other Supply	777	54
Total Costs (Million$/Year)	**206,855**	**27,789**
Shortage	15,759	-13,972
Supply[c]	191,096	41,760

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Energy costs of conveyance are included in the cost estimates.

Costs are presented in 2010 dollars.

The No Project/No Action Alternative water deliveries, other water supply, and total supply costs, including management options (the sum of modeled conservation, recycling, and desalination) are reported for the South Coast hydrologic region for long-term and Dry and Critical water year average conditions, including changes from Existing Conditions, in Table 22-23. These changes would occur in the Southern California subregion of the Extended Study Area.

When comparing the No Project/No Action Alternative to Existing Conditions, total water supply and costs would increase. The increase in water management options reflects the adoption of conservation, recycling, and desalinization to meet increased demand for the No Project/No Action Alternative. Other supply would decrease, such as transfers, with demand being met by management options. Although shortages costs would decrease, the increase in total cost is expected to occur with increased water supply costs, such as the real price of energy.

Table 22-23
Comparison of M&I Water Supply Deliveries and Costs for the South Coast Hydrologic Region for the No Project/No Action Alternative and Existing Conditions

Analysis Metric	No Project/No Action Alternative	Change from Existing Conditions
Long-Term Water Year Average		
Total Supply (TAF/Year)	**5,019**	**441**
Project Delivery	1,371	49
Management Options[a]	510	510
Other Supply	3,138	-118
Total Costs (Million $/Year)	**1,763,622**	**427,827**
Shortage	109,330	-29,937
Supply[c]	1,654,292	57,763
Dry and Critical Water Year Average[b]		
Total Supply (TAF/Year)	**4,719**	**275**
Project Delivery	1,052	-36
Management Options[a]	510	510
Other Supply	3,157	-199
Total Costs (Million $/Year)	**2,038,745**	**532,548**
Shortage	302,768	-112,212
Supply[c]	1,735,977	644,760

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Energy costs of conveyance are included in the cost estimates.

Costs are presented in 2010 dollars.

The average annual water deliveries and associated shortage and supply costs for long-term and Dry and Critical water year average conditions in urban areas modeled outside of the San Francisco Bay-South and South Coast hydrologic regions in the Extended Study Area for the No Project/No Action Alternative, including the difference from Existing Conditions, are listed in Table 22-24. When

comparing the No Project/No Action Alternative to Existing Conditions, the change in water deliveries would vary. An increase in water shortages and supply costs is expected from implementation of the No Project/No Action Alternative, with increased demand and water supply costs, such as the real price of energy.

Table 22-24
Comparison of M&I Water Supply Deliveries and Costs Modeled in OMWEM for the No Project/No Action Alternative and Existing Conditions

Water Delivery Region	Average Annual Project Water Deliveries (TAF)		Average Annual Shortage and Supply[c] Cost (Thousand $)	
	No Project/No Action Alternative	Change from Existing Conditions	No Project/No Action Alternative	Change from Existing Conditions
Long-Term Water Year Average				
Delta	54,332	1,193	9,742	4,091
Bay Area[a]	52,450	4,854	5,860	5,831
Central Coast	45,372	-216	2,692	2,637
Sacramento Valley	22,817	127	4,553	3,389
San Joaquin	99,699	-2,937	1,621	787
Southern California[b]	251,867	6,354	22,496	11,593
Dry and Critical Water Year Average[d]				
Delta	40,672	-4,095	19,422	9,406
Bay Area[a]	36,340	709	11,739	11,659
Central Coast	23,822	-3,686	7,449	7,296
Sacramento Valley	20,697	-68	11,117	8,185
San Joaquin	72,847	-2,790	2,921	1,278
Southern California[b]	186,488	-21,104	47,788	26,350

[a]The results shown here are for San Benito County only.

[b]The results shown here exclude South Coast Hydrologic Area, which is shown separately.

[c]This estimate does not include all water supply-related costs. It includes annual shortage costs and supply costs that might be affected by alternatives, including transfers, groundwater pumping, or other water management options

[d]Sacramento River 40-30-30 index.

Notes:

M&I = municipal and industrial
OMWEM = Other Municipal Water Economics Model
TAF = thousand acre feet

Costs are presented in 2010 dollars.

Water quality conditions in the Extended Study Area were evaluated and discussed with a focus on the salinity conditions specific to regions with modeled salinity costs. The No Project/No Action Alternative long-term average export-weighted annual total dissolved solids (TDS) for the Metropolitan Water District of Southern California, long-term average export-weighted annual TDS and chloride for the Contra Costa and Santa Clara Water District service areas, costs associated with the respective water quality levels, and the difference from Existing Conditions are reported in Table 22-25.

When comparing the No Project/No Action Alternative to Existing Conditions, long-term average export-weighted annual TDS and chloride would decrease. The increase in average annual costs is

expected with increased service area population, increasing the total households and related water quality related damages.

Table 22-25
Comparison of M&I Salinity Costs for the No Project/No Action Alternative and Existing Conditions[a,c]

Water Delivery Service Area	Analysis Metric	No Project/No Action Alternative	Change from Existing Conditions
Long-Term Water Year Average			
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	239.8	-7.4
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	253.9	-14.5
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	60.6	-10.4
Metropolitan Water District of Southern California	Average Annual Cost (Thousand $)	N/A	547.0
Contra Costa and Santa Clara Water Districts		N/A	110.8
Dry and Critical Water Year Average[b]			
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	313.0	-8.9
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	275.5	-23.9
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	83.9	-20.1
Metropolitan Water District of Southern California	Average Annual Cost (Thousand $)	N/A	563.1
Contra Costa and Santa Clara Water Districts		N/A	108.6

[a]Results include some damages related to agricultural production in Metropolitan Water District of Southern California's Service Area.

[b]Sacramento River 40-30-30 index.

[c]The Lower Colorado River Basin Water Quality Model and was used for the Metropolitan Water District of Southern California service area and the South Bay Water Quality model was used for the Contra Costa and Santa Clara Water District service areas.

Notes:

M&I = municipal and industrial
mg/L = milligrams per liter
N/A = not applicable
TDS= total dissolved solids

Costs are presented in 2010 dollars.

The change in cost related to M&I water supply and quality in the Extended Study Area would primarily be a result of additional demand and the real increase in water supply-related costs, such as the increase in energy prices. Additional demand would increase the total damages associated with water quality even in the absence of a change in water quality. However, increasing demand would be accompanied by corresponding development of water supply projects and use reduction measures, such as conservation, recycling, and desalinization. Therefore, it is expected that the growth in water supply demand would be

accompanied by water supply development. Therefore, **there would not be a substantial adverse effect** on M&I water use economics, when compared to Existing Conditions.

22.3.5.2 Secondary Study Area – No Project/No Action Alternative

Construction, Operation, and Maintenance Impacts

Because the operational effects of the No Project/No Action Alternative were included in the analysis of the Extended Study Area, no separate impact analyses were undertaken for the economic or social effects of the No Project/No Action Alternative in the Secondary Study Area.

22.3.5.3 Primary Study Area – No Project/No Action Alternative

Construction, Operation, and Maintenance Impacts

If the No Project/No Action Alternative is implemented, the Project would not be constructed, and socioeconomic effects in the Primary Study Area are expected to be similar to that described for Existing Conditions. In addition, projects included in the No Project/No Action Alternative are not located within the Primary Study Area, and therefore **would not have a substantial adverse effect** on socioeconomic resources, when compared to Existing Conditions.

22.3.6 Impacts Associated with Alternative A

22.3.6.1 Extended Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

Hydrologic Regions, Water Delivery Regions, and Water Delivery Service Areas

Impact Socio-1: Substantial Adverse Effects on Regional Economics

Agricultural production in the Extended Study Area is expected to change from operation of Alternative A and the resulting changes to SWP and CVP deliveries, impacting employment and income. The estimated change in agricultural production is discussed as effects on agricultural economics (Impact Socio-5). The regional economic effects on employment and income from a change in agricultural production during Project construction, operation, and maintenance would not differ between Existing Conditions and the No Project/No Action Alternative (Table 22-26).

Table 22-26
Change in Extended Study Area Regional Employment and Income Associated with Implementation of Alternative A when Compared to the No Project/No Action Alternative[a,b,c]

Impact	Annual Labor Income (Thousand $)[d]		Annual Jobs	
	Direct	Total[e]	Direct	Total[e]
Agriculture	848	1,996	44.7	72.1

[a]Average annual effect based on long-term water year average conditions.

[b]Based on changes in agricultural production (irrigated acreage) and agricultural commodity prices.

[c]IMPLAN results are changes relative to Existing Conditions and the No Project/No Action Alternative.

[d]Income is reported 2010 dollars.

[e]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Source: Pavich, 2012a.

The increased reliability associated with Alternative A water deliveries would be expected to increase agricultural production in the Extended Study Area less than one percent. This, in turn, would increase annual employment by approximately 72 individuals and annual labor income by more than $1.9 million.

Construction, operation, and maintenance activities would affect the regional economic condition of the Extended Study Area through construction and operation expenditures; Project footprint impacts, such as removal of agricultural land from production; and Project-related impacts. However, the magnitude of the impacts is relatively minor, when compared to the regional economy of the Extended Study Area. Therefore, additional regional economic effects related to Alternative A construction, operation, and maintenance are discussed for the Primary Study Area only.

The increase in total employment and income in the Extended Study Area would result from an increase in agricultural production. The increase in employment and income would not be considered an adverse effect on the regional economy of the Extended Study Area. Therefore, a **less-than-significant impact** on regional economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-2: Substantial Adverse Effects on Population and Housing

The expected population and housing changes associated with construction, operation, and maintenance of Alternative A would be minor, when compared to the population and housing in the Extended Study Area. Therefore, a **less-than-significant impact** on population and housing is expected in the Extended Study Area, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-3: Substantial Adverse Effects on Local Government Fiscal Conditions

The expected local government fiscal conditions changes associated with the construction, operation, and maintenance of Alternative A would be minor, when compared to the government fiscal conditions in the Extended Study Area. Therefore, a **less-than-significant impact** on local government fiscal conditions is expected in the Extended Study Area, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-4: Substantial Adverse Effects on Recreation Economics

The expected changes to recreation economics associated with Alternative A would be minor, when compared to the recreation economics in the Extended Study Area. Therefore, a **less-than-significant impact** on recreation economics is expected in the Extended Study Area, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Estimated agricultural economic changes would be driven by changes in water delivery and water quality conditions. Table 22-27 summarizes the expected changes in irrigated acreage and value of agricultural production that would result in the SWP and CVP export areas as a result of Alternative A operation. Changes are described relative to Existing Conditions and the No Project/No Action Alternative.

Changes in acreage and value relative to Existing Conditions would result from a combination of Alternative A and underlying changes in land use and crop mix unrelated to Alternative A. Total value of irrigated crop production in the Extended Study Area would increase on average by over $3.125 billion per year, with total irrigated crop acreage declining by approximately 19,000 acres. The increase in demand and subsequent real price of agricultural output for the No Project/No Action Alternative, when

compared to Existing Conditions, is the reason for the increase in total value of production, even with the decline in irrigated acres.

Changes relative to the No Project/No Action Alternative provide an estimate of the changes solely from Alternative A. Total value of irrigated crop production in the Extended Study Area would increase on average by approximately $3.8 million per year, with total irrigated crop acreage increasing by approximately 2,000 acres. In Dry and Critical water year average conditions, the value of production would be approximately $24 million per year higher than for the No Project/No Action Alternative Dry and Critical water year average conditions.

Changes in production costs and investments are a result of, and consistent with, changes in crop acreage. Changes compared to Existing Conditions would be dominated by long-term trends in crop acreage and cropping patterns that are unrelated to Alternative A. Increases in costs and investments relative to the No Project/No Action Alternative would result from the changes in crop acreage shown in Table 22-27. Water supply and crop acreage would increase relative to No Project/No Action Alternative, so no investments in production facilities or growing stock would be lost as a result of implementation.

Table 22-27
Change in Acres and Value of Agricultural Production Associated with Implementation of Alternative A when Compared to the Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Results of Alternative A	Change from Existing Conditions	Change from No Project/No Action Alternative
Long-Term Water Year Average			
Total Crop Acreage (Thousand Acres)	**7,487**	**-19**	**2**
Sacramento Valley[a]	1,908	3	1
San Joaquin[a]	5,579	-22	1
Total Value of Production (Million $)	**22,000.3**	**3,125.7**	**3.8**
Sacramento Valley	3,713.6	442.3	2.3
San Joaquin	18,286.7	2,683.3	1.5
Dry and Critical Water Year Average[b]			
Total Crop Acreage (Thousand Acres)	**7,469**	**N/A**	**17**
Sacramento Valley	1,904	N/A	6
San Joaquin	5,565	N/A	11
Total Value of Production (Million $)	**22,019.4**	**N/A**	**24.4**
Sacramento Valley	3,703.1	N/A	7.0
San Joaquin	18,316.3	N/A	17.4

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions

Notes:

N/A = not applicable

Value of production is based on prices received by farmers, in 2010 dollars.

Long-term average export-weighted TDS and electrical conductivity (EC) would decrease if Alternative A is implemented, when compared to Existing Conditions and the No Project/No Action Alternative, resulting in improved water quality for agricultural production. The economic value of the salinity change is the avoided cost of groundwater pumping. For the Extended Study Area as a whole, the value of avoided pumping as it relates to improved water quality would be approximately $0.436 million per year, when compared to No Project/No Action Alternative.

Table 22-28 summarizes the volume and cost of groundwater pumped in the Extended Study Area. Results are based on SWAP model analysis. Changes in volume and cost relative to Existing Conditions would result from a combination of Alternative A and underlying changes in land use and crop mix unrelated to Alternative A. Total volume pumped in the Extended Study Area would decline on average by almost 462 thousand acre feet (TAF) per year, and total cost of pumping would increase by approximately $97 million per year. The decreased groundwater pumping would be a result of additional surface water available to agriculture in the No Project/No Action Alternative, when compared to Existing Conditions. The increase in pumping costs would be a result of the increase in real energy costs in the No Project/No Action Alternative, when compared to Existing Conditions.

Table 22-28
Change in Volume and Cost of Groundwater Pumping Associated with Implementation of Alternative A when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Results of Alternative A	Change from Existing Conditions	Change from No Action Alternative
Long-Term Water Year Average			
Annual Groundwater Pumped (TAF)	**6,506.5**	**-461.7**	**-49.9**
Sacramento Valley[a]	1,395.9	-132.5	-9.1
San Joaquin[a]	5,110.6	-329.2	-40.8
Annual Cost of Pumping (Million $)	**694.6**	**97.4**	**-7.1**
Sacramento Valley	116.4	12.4	-0.6
San Joaquin	578.2	85.0	-6.5
Dry and Critical Water Year Average[b]			
Annual Groundwater Pumped (TAF)	**7,156.7**	**N/A**	**-59.3**
Sacramento Valley	1,418.3	N/A	-12.7
San Joaquin	5,738.4	N/A	-7.0
Annual Cost of Pumping (Million $)	**780.6**	**N/A**	**-7.4**
Sacramento Valley	117.8	N/A	-0.9
San Joaquin	662.8	N/A	-6.5

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions

Notes:

TAF = thousand acre feet

Cost of pumping is based on prices received by farmers, in 2010 dollars.

Changes relative to the No Project/No Action Alternative provide an estimate of the changes solely from Alternative A. Total volume pumped in the Extended Study Area would decline on average by approximately 50 TAF per year, and total cost of pumping would decline by approximately $7 million per year. The declines in pumping and cost would be larger in the Dry and Critical water year average condition.

When comparing Alternative A to Existing Conditions, changes in agricultural economics impacts would result from a combination of Alterative A and underlying changes in land use, crop mix, and real energy and agricultural commodity prices unrelated to Alternative A. The changes that would occur solely as a result of Alternative A, an increase in the value of production and a decrease in groundwater pumping cost, are not considered an adverse effect on the agricultural economy in the Extended Study Area (Tables 22-27 and 22-28). Therefore, a **less-than-significant impact** on agricultural economics is expected, when compared to Existing Conditions.

When comparing Alternative A to the No Project/No Action Alternative, the increase in the value of production, along with the decrease in groundwater pumping cost, are not considered an adverse effect on the agricultural economy in the Extended Study Area (Tables 22-27 and 22-28). Therefore, a **less-than-significant impact** on agricultural economics is expected, when compared to the No Project/No Action Alternative.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

Changes in water supply reliability and related water supply costs in the Extended Study Area attributable to Alternative A operations are described relative to Existing Conditions and the No Project/No Action Alternative. Discussion in this section focuses on the change in water supply reliability specific to urban areas in the SWP and CVP service areas, and estimates of associated changes in water supply costs.

Changes in water supply reliability and related water supply costs in the San Francisco Bay – South hydrologic region are shown in Table 22-29. Project deliveries would increase in Alternative A in long-term and Dry and Critical water year average conditions, when compared to Existing Conditions and the No Project/No Action Alternative. No water management options are included in Existing Conditions. Therefore, when comparing Alternative A with Existing Conditions, the change in management options would always be zero or positive. When comparing Alternative A with the No Project/No Action Alternative, the increase in Project deliveries would not reduce the use of management options (conservation, recycling, and desalination) but would decrease the use of other supplies. Other supplies include local surface water and groundwater, imported non-Project water, baseline recycling and desalination, and transfers.

When comparing Alternative A with Existing Conditions, supply costs would increase in the San Francisco Bay – South hydrologic region in long-term and Dry and Critical water year average conditions. The increase in supply costs would result from increases in population and real energy prices that occur in future conditions. This increase in supply cost would overwhelm any decrease in shortage costs, causing total costs to increase. When comparing Alternative A with the No Project/No Action Alternative, the additional Project deliveries, with little change in management options, would increase supply costs. However, shortage costs would decrease enough to offset the increase in supply costs, reducing total costs.

Table 22-29
Change in M&I Water Supply Deliveries and Costs for the San Francisco Bay-South Hydrologic Region Associated with Implementation of Alternative A when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Results of Alternative A	Change from Existing Conditions	Change from No Project/No Action Alternative
Long-Term Water Year Average			
Total Supply (TAF/Year)	**1,272**	**92**	**19**
Project Delivery	434	48	8
Management Options[a]	22	22	12
Other Supply	816	21	-1
Total Costs (Million $/Year)	**206,205**	**36,252**	**-1,666**
Shortage	3,547	-7,083	-1,931
Supply[c]	202,659	43,335	265
Dry and Critical Water Year Average[b]			
Total Supply (TAF/Year)	**1,192**	**115**	**26**
Project Delivery	394	40	16
Management Options[a]	22	22	12
Other Supply	776	52	-2
Total Costs (Million$/Year)	**201,727**	**22,661**	**-5,128**
Shortage	9,921	-19,809	-5,837
Supply[c]	91,806	42,470	710

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives, including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Costs are presented in 2010 dollars.

Changes in water supply reliability and related water supply costs in the South Coast hydrologic region are shown in Table 22-30. Project deliveries would increase in Alternative A in long-term and Dry and Critical water year average conditions, when compared to Existing Conditions and the No Project/No Action Alternative. No water management options are included in Existing Conditions. Therefore, when comparing Alternative A with Existing Conditions, the change in management options would always be zero or positive. When comparing Alternative A with the No Project/No Action Alternative, the increase in Project deliveries would allow for increased deliveries to carryover storage and/or reduce the use of management options (conservation, recycling, and desalination) and other supply (transfers).

When comparing Alternative A with Existing Conditions, supply costs would increase in the South Coast hydrologic region in long-term and Dry and Critical water year average conditions. The increase in supply costs would result from population and real energy price increases that occur in future conditions. This increase in supply cost would overwhelm any decrease in shortage costs, causing total costs to increase. When comparing Alternative A with the No Project/No Action Alternative, the additional Project deliveries would reduce the use of management options and other supplies, reducing supply costs. The accompanying reduction in shortage costs would decrease total costs.

Table 22-30
Change in M&I Water Supply Deliveries and Costs for the South Coast Hydrologic Region Associated with Implementation of Alternative A when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Results of Alternative A	Change from Existing Conditions	Change from No Action Alternative
Long-Term Water Year Average			
Total Supply (TAF/Year)	**5,045**	**467**	**26**
Project Delivery	1,434	111	62
Management Options[a]	507	507	-3
Other Supply	3,105	-151	-33
Total Costs (Million $/Year)	**1,702,870**	**367,075**	**-60,752**
Shortage	68,429	-170,837	-40,901
Supply[c]	1,634,441	537,912	-19,851
Dry and Critical Water Year Average[b]			
Total Supply (TAF/Year)	**4,779**	**334**	**59**
Project Delivery	1,189	101	137
Management Options[a]	507	507	-3
Other Supply	3,082	-274	-75
Total Costs (Million$/Year)	**1,914,710**	**408,513**	**-124,035**
Shortage	206,045	-208,935	-96,723
Supply[c]	1,708,665	617,448	-27,312

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives, including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Costs are presented in 2010 dollars

When comparing Alternative A and Existing Conditions in the Extended Service Area outside of the San Francisco Bay – South and South Coast hydrologic regions, Project water deliveries would increase in long-term and Dry and Critical water year average conditions, excluding the Delta. When comparing Alternative A to the No Project/No Action Alternative, Project deliveries would increase in long-term and Dry and Critical water year average conditions (Table 22-31).

When comparing Alternative A and Existing Conditions, shortage and water supply costs would increase in both long-term and Dry and Critical water year average conditions. The increase in supply costs would result from population and real energy price increases that occur in future conditions. When comparing Alternative A to the No Project/No Action Alternative, shortage and water supply costs would decrease, Table 22-31. The increase in Project deliveries would reduce shortage and water supply costs.

Table 22-31
Change in M&I Water Supply Deliveries and Costs Modeled in OMWEM Associated with Implementation of Alternative A when Compared to Existing Conditions and the No Project/No Action Alternative

Water Delivery Region	Analysis Metric					
	Average Annual Project Water Delivery (TAF)			Average Annual Shortage and Supply Cost[c] (Thousand $)		
	Results of Alternative A	Change from Existing Conditions	Change from No Project/No Action Alternative	Results of Alternative A	Change from Existing Conditions	Change from No Project/No Action Alternative
Long-Term Water Year Average						
Delta	56	3	1	9,337	3,686	-405
Bay Area[a]	55	7	2	5,626	5,597	-234
Central Coast	47	2	2	1,459	1,403	-1,234
Sacramento Valley	23	0	0	4,410	3,247	-143
San Joaquin	104	1	4	1,592	758	-29
Southern California[b]	264	19	13	14,654	3,751	-7,842
Dry and Critical Water Year Average[d]						
Delta	44	-1	3	18,494	8,478	-929
Bay Area[a]	39	4	3	11,227	11,147	-512
Central Coast	28	0	4	4,035	3,882	-3,413
Sacramento Valley	21	0	0	10,747	7,815	-369
San Joaquin	82	6	9	2,804	1,161	-117
Southern California[b]	215	8	29	26,676	5,237	-21,113

[a]The results shown here are for San Benito County only.

[b]The results shown here exclude South Coast Hydrologic Area, which is shown separately.

[c]This estimate does not include all water supply-related costs. It includes annual shortage costs and supply costs that might be affected by alternatives, including transfers, groundwater pumping, or other water management options

[d]Sacramento River 40-30-30 index.

Notes:

M&I = municipal and industrial
OMWEM = Other Municipal Water Economics Model
TAF = thousand acre feet

Energy costs of conveyance are included in the cost estimates.

Costs are presented in 2010 dollars.

The change in salinity-related costs in the Extended Study Area attributable to Alternative A operations relative to Existing Conditions and the No Project/No Action Alternative is shown in Table 22-32. Discussion in this section focuses on the change in salinity costs specific to regions with modeled salinity costs.

Table 22-32
Change in Water Supply Salinity Costs Associated with Implementation of Alternative A when Compared to Existing Conditions and the No Project/No Action Alternative[a]

Water Delivery Service Area	Analysis Metric	Results of Alternative A	Change from Existing Conditions	Change from No Action Alternative
Long-Term Water Year Average				
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	234.3	-12.9	-5.5
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	59.3	-11.7	-1.4
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	252.4	-16.0	-1.5
Metropolitan Water District of Southern California	Average Annual Cost (Million $)	N/A	$537.1	-$10.0
Contra Costa and Santa Clara Water Districts		N/A	$112.9	-$1.0
Dry and Critical Water Year Average[b]				
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	299.3	-22.6	-13.7
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	81.2	-22.7	-2.7
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	273.6	-25.8	-1.9
Metropolitan Water District of Southern California	Average Annual Cost (Million $)	N/A	$544.9	-$18.1
Contra Costa and Santa Clara Water Districts		N/A	$110.3	-$1.3

[a]Results include some damages related to agricultural production in Metropolitan Water District of Southern California's Service Area.

[b]Sacramento River 40-30-30 index.

Notes:

mg/L = milligrams per liter
N/A = Not applicable
TDS= total dissolved solids

Costs are presented in 2010 dollars. The Lower Colorado River Basin Water Quality Model was used for the Metropolitan Water District of Southern California service area and the South Bay Water Quality model was used for the Contra Costa and Santa Clara Water District service areas.

When comparing Alternative A with Existing Conditions, long-term average export-weighted annual TDS and chloride would decrease in long-term and Dry and Critical water year average conditions across service areas. However, average annual costs would increase. This increase is expected due to population increases that occur in future conditions. When comparing Alternative A with the No Project/No Action Alternative, long-term average export-weighted annual TDS and chloride would decrease in long-term and Dry and Critical water year average conditions in the Metropolitan Water District of Southern California and Contra Costa and Santa Clara Water District service areas. The improvement in water quality would reduce damages in long-term and Dry and Critical water year average conditions.

When comparing Alternative A to Existing Conditions, changes in M&I water use economics impacts would result from a combination of Alterative A and underlying changes in population and the real cost of energy, impacting water system operation costs. The change that would occur solely as a result of Alternative A, decreasing total costs, is not considered an adverse effect on M&I water use economics in the Extended Study Area. Therefore, a **less-than-significant impact** on M&I water use economics is expected, when compared to Existing Conditions.

When comparing Alternative A to the No Project/No Action Alternative, the increase in water supply and quality would decrease total costs, which is not considered an adverse effect on the M&I water use economics in the Extended Study Area. Therefore, a **less-than-significant impact** on water use economics is expected, when compared to the No Project/No Action Alternative.

22.3.6.2 Secondary Study Area – Alternative A

The operational effects within the Secondary Study Area are included in the analysis of the Extended Study Area and/or Primary Study Area. For example, the minor construction- and operation-related activities at the Red Bluff Pumping Plant are expected to have less-than-significant socioeconomic effects, but are included in the overall construction and operational expenditures used in the regional economic analysis for the Extended and Primary study areas.

22.3.6.3 Primary Study Area – Alternative A

Construction, Operation, and Maintenance Impacts

All Primary Study Area Project Facilities

Impact Socio-1: Substantial Adverse Effects on Regional Economics

The regional economic effects on employment and income in the Primary Study Area were evaluated for Project construction, operation, and maintenance. Changes are shown relative to Existing Conditions and the No Project/No Action Alternative. There is no difference between the Existing Conditions and No Project//No Action Alternative model used in the analysis. The effects of construction, operation, and maintenance expenditures to employment and income are shown in Table 22-33.

The Project footprint and related facilities, such as roads and utilities, would remove some existing agricultural land from production, so the effects on employment and income would be negative. Some agricultural land removed from production would be temporary, and would be restored to its original use following the construction period.

Alternative A would increase economic activity related to land acquisition in the Primary Study Area. This regional economic impact would be temporary, occurring 12 to 18 months prior to construction. The expected regional economic effects to employment and income in the Primary Study Area from land acquisition are reported in Table 22-33.

Table 22-33
Temporary Change in Regional Employment and Income Associated with Implementation of Alternative A when Compared to the No Project/No Action Alternative[a,b]

Impact	Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[c]	Direct	Total[c]
Agriculture	-636	-1,242	-44.0	-62.2
Land Acquisition	625	717	14.7	17.5
Construction	19,940	44,544	95.9	626.1
Total	**19,929**	**44,019**	**66.6**	**581.4**

[a]Average annual effect based on entire period of construction. The duration of each impact will vary.
[b]IMPLAN results are changes relative to Existing Conditions and the No Project/No Action Alternative.
[c]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 2012a.

The expected permanent effects to employment and income from operation and maintenance are shown in Table 22-34. Alternative A would also increase recreational opportunities in the Primary Study Area. The increased recreational expenditures would affect employment and income. The expected regional economic effects to employment and income in the Primary Study Area from the increase in recreational expenditures are reported in Table 22-34.

Table 22-34
Permanent Change in Regional Employment and Income Associated with Implementation of Alternative A when Compared to the No Project/No Action Alternative[a,b]

Impact	Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[c]	Direct	Total[c]
Recreation	487	588	20.1	22.9
Agriculture	-204	-381	-4.7	-9.9
Operation	1,750	2,120	35.0	45.7
Total	**2,033**	**2,327**	**50.4**	**58.7**

[a]Average annual effect based over life of Alternative A.
[b]IMPLAN results are changes relative to Existing Conditions and the No Project/No Action Alternative.
[c]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported in 2010 dollars.

Source: Pavich, 2012a.

Total employment and income in the Primary Study Area would increase as a result of construction, operation, land acquisition, and a change in agricultural production and recreational opportunities. The increase in employment and income would not be considered an adverse effect on the regional economy of the Primary Study Area. Therefore, a **less-than-significant impact** on regional economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-2: Substantial Adverse Effects on Population and Housing

Population

Construction and operation of Alternative A would require an estimated annual average of 96 and 35 workers, respectively, with a maximum of 60 daily workers for operation. It is anticipated that approximately 50 percent of the construction jobs would be filled from within the existing two-county labor force. However, construction may require specialized skills not readily available in the local labor pool. As a result, it is anticipated that some of the non-local workers would be imported from outside of the two-county region.

When considering the multi-year duration of construction, it is anticipated that 20 percent of the imported workers would relocate to the two-county region, adding to the local population. It is anticipated that all of the workers required for operation would relocate to the two-county region. This additional population from construction and operation would constitute a minor increase in the total 2020 projected Primary study area population of 64,605, and would not pose a burden on local public services, utilities, or infrastructure. Therefore, impacts are considered **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Housing

Changes in housing demand are based on changes in supply resulting from displacement during Project facility construction and changes in housing demand resulting from employment associated with construction and operation of Alternative A.

The construction and operation workforce would most likely commute daily to the Project sites from within the two-county region; however, if needed, there are approximately 2,000 available housing units, as reported in the Environmental Setting/Affected Environment discussion, to accommodate workers who may choose to commute to the Project sites on a workweek basis or who may choose to relocate to the region for the duration of the construction period. In addition to the available housing units, there are recreational vehicle parks within the two-county region to accommodate construction workers. As a result, construction and operation of the Project is not expected to increase the demand for housing within the two-county region.

Within specific local communities, there could be localized effects on housing during construction. However, given the availability of housing within the two-county region, predicting where this impact would occur would be speculative. Construction and operation of Alternative A would result in minor population increases in the Primary Study Area, with adequate housing supply to accommodate the change in population. Therefore, impacts are considered **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-3: Substantial Adverse Effects on Local Government Fiscal Conditions

Table 22-35 lists the change in annual property tax receipts associated with the implementation of Alternative A. For Glenn County, the annual property tax amount that would be removed from the annual tax revenues would be $28,428, or approximately 0.033 percent of the overall revenues for Glenn County. For Colusa County, the annual property tax amount that would be removed from the annual tax revenues from Alternative A would be $252,366, or approximately 0.415 percent of the overall revenues for Colusa County. The counties may also incur costs associated with increased County services that may become necessary as a result of implementing the Project.

A decrease in property tax receipts in the Primary Study Area would result from Alternative A. However, the decrease in property tax revenue would be less than five percent of the overall county revenues. Therefore, impacts of Alternative A to local government fiscal conditions are considered **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Table 22-35
Change in Property Tax Receipts Associated with Implementation of Alternative A when Compared to the No Project/No Action Alternative

County	Change in Annual Property Tax 2010 ($)	Percentage of County Revenue 2012 Budget (%)
Glenn	28,428	0.033
Colusa	252,366	0.415

Source: Colusa County, 2012.

Impact Socio-4: Substantial Adverse Effects on Recreation Economics

Alternative A would provide recreational opportunities within the Primary Study Area. Table 22-36 shows the estimated number of visitors to Sites Reservoir if Alternative A is implemented. Also included are recreation expenditures attributable to the portion of visitors outside the Primary Study Area. This recreation expenditure information is used to assess the effects on regional economics, i.e., the impact on employment and income. The anticipated total recreation visitation to Sites Reservoir would be more than 360,000 annual visits, increasing recreation expenditures from outside of the Primary Study Area by almost $3 million.

Table 22-36
Estimated Sites Reservoir Recreation Visitation and Expenditures Associated with Implementation of Alternative A*

Activity / Spending Category	Alternative A	
	Visits (Recreation Visitor Days)	Associated Non-Local Spending
Shore fishing	31,405	$214,838
Boat fishing	16,244	$111,123
Picnicking	83,024	$692,092
Sightseeing	71,473	$605,566
Swimming / beach use	81,580	$680,056
Walking	10,468	$74,794
Bicycling	4,693	$33,528
Boating / water-skiing	56,312	$469,419
Other	2,888	$24,073
Total	**358,087**	**$2,905, 489**

*Based on long-term water year average conditions.

Notes:

Costs are presented in 2010 dollars.

Attributed to reservoir-recreation only; the analysis does not account for changes in recreation spending attributed to river-based recreation.

Source: Pavich, 2012b.

Increased levels of recreation at Sites Reservoir would increase recreation expenditures in the Primary Study Area. An increase in recreation expenditures is not considered an adverse effect on the recreation economy of the Primary Study Area. Therefore, a **less-than-significant impact** on recreation economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Construction of Alternative A would convert land from existing agricultural uses to uses that include Project facility footprints, construction staging areas, temporary and permanent roads, utilities, and open space undeveloped lands.

Changes in crop acreage were used to describe the associated changes in economic values. Table 22-37 summarizes the changes in acreage and value of agricultural production that would result in the Primary Study Area as a result of Alternative A construction. Changes are shown relative to Existing Conditions and the No Project/ No Action Alternative by aggregate crop category (agricultural resources do not differ between Existing Conditions and the No Project/No Action Alternative).

Table 22-37
Change in Crop Acres and Value of Agricultural Production Associated with Implementation of Alternative A when Compared to Existing Conditions and No Project/No Action Alternative

Analysis Metric	Alternative A Baseline[b]	Change from Existing Conditions and the No Project/No Action Alternative	
		Temporary[c]	Permanent[c]
Total Crop Acreage (Thousand Acres)[a]	**889.3**	**-4.5**	**-26.2**
Rice	247.2	-3.1	-0.2
Almonds	109.4	-0.1	0.0
Hay and Forage	94.3	-0.2	-0.6
Wheat	22.5	-0.3	-0.1
Tomatoes, Processing	27.9	-0.1	-0.1
Rangeland	388.1	-0.7	-25.3
Total Value of Production (Million $)[a]	**1,050.9**	**-7.1**	**-1.5**
Rice	486.8	-5.8	-0.3
Almonds	359.4	-0.5	-0.1
Hay and Forage	92.0	-0.2	-0.6
Wheat	12.9	-0.2	0.0
Tomatoes, Processing	96.2	-0.4	-0.3
Rangeland	3.7	-0.1	-0.3

[a]Total crop acreage and value of production differ from the sum of individual categories due to rounding.
[b]Permanent impacts of Alternative A.
[c]Temporary impacts are a result of Project construction. Permanent impacts are a result of Project operation.

Note:
Value of production is based on prices received by farmers, in 2010 dollars.

Source: Pavich, 2012c.

Total value of crop production in the Primary Study Area would be expected to decline on average by $7.1 million per year during the Project construction period, and by $1.5 million per year during Project operation. Total crop acreage would decline by approximately 4,500 acres during Project construction (temporary change) and 26,200 acres during Project operation (permanent change). The majority of the

decrease in crop acreage during construction would be associated with rice and almost all of the decrease in crop acreage during Project operation would be associated with rangeland.

Alternative A may also affect production costs on lands even if revenues are largely unaffected. Costs could be associated with operational constraints and longer travel times due to Project construction. Construction designs and costs have provided for such effects in two ways. In most cases, affected lands would be within the Project facilities footprint, and are included in the agricultural acreage and value of production described elsewhere in this chapter. For potentially affected lands not included in the facilities footprint, construction costs include temporary and permanent roads and other facilities, as needed to support agricultural production. There could be some additional travel time and other costs associated with using these facilities, but such costs are not environmental impacts requiring mitigation.

Loss of investments in production facilities would occur as a result of Project facilities construction. The value of structures and equipment potentially affected would vary widely across parcels. Much of the equipment is portable (e.g., machinery, tools, portable sprinkler pipe), and could be sold or used on other lands. Shop and storage buildings and permanent irrigation and drainage equipment may have little or no salvage value. The negotiated purchase of lands for the conveyance and associated facilities would compensate for salvage value accordingly. According to Cooperative Extension cost of production studies, permanent structures, irrigation systems, and drainage systems can represent a wide range in investment, from less than $100 per acre for field and vegetable crops up to more than $3,000 per acre for some orchards (UCCE, 2008 and 2011). Most of the facilities would not be new, so their depreciated values would be substantially lower.

Land improvements, including orchards, would also be considered during negotiations for land purchases. Typical investments required to bring permanent crops into production were described in Section 22.2. Forage crops, such as irrigated pasture and alfalfa, require an establishment cost of approximately $400 per acre. The depreciated values of the growing stock could be substantially below these establishment costs, depending on the ages of the stands that would be affected.

Construction and operation of Alternative A would reduce the total value of agricultural production in the Primary Study Area. DWR and Reclamation would provide compensation to property owners for the fair market value of any property acquired through eminent domain for the Project. The decrease in the total value of agricultural production would be less than five percent of the total value of agricultural production in the Primary Study Area. Therefore, a **less-than-significant impact** is expected to the agricultural economy in the Primary Study Area, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

Refer to the **Socio-6** discussion for the Extended Study Area. Given the absence of any affected M&I facilities serving the Primary Study Area residents, no M&I water use economic effects are expected in the Primary Study Area. Therefore, there would be **no impact**, when compared to Existing Conditions and the No Project/No Action Alternative

22.3.7 Impacts Associated with Alternative B

22.3.7.1 Extended Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

Hydrologic Regions, Water Delivery Regions, and Water Delivery Service Areas

The impacts associated with Alternative B, as they relate to population and housing (**Impact Socio-2**), local government fiscal conditions (**Impact Socio-3**), and recreation economics (**Impact Socio-4**), would be the same as described for Alternative A for the Extended Study Area.

The operational differences of Alternative B within the Extended Study Area, when compared to Alternative A, for the effects on regional economics (**Impact Socio-1**), agricultural economics (**Impact Socio-5**), and M&I water use economics (**Impact Socio-6**) are discussed below.

Impact Socio-1: Substantial Adverse Effects on Regional Economics

Agricultural production in the Extended Study Area would change from operation of Alternative B and the resulting changes to SWP and CVP project deliveries, impacting employment and income. The estimated change in agricultural production is discussed in effects on agricultural economics (Impact Socio-5). The regional economic effects on employment and income from a change in agricultural production during Project construction, operation, and maintenance would not differ between Existing Conditions and the No Project/No Action Alternative (Table 22-38).

The expected increased reliability associated with Alternative B water deliveries would increase agricultural production in the Extended Study Area less than one percent. This, is turn, would increase annual employment by approximately 60 individuals and annual labor income by more than $1.7 million.

Table 22-38
Change in Extended Study Area Regional Employment and Income Associated with Implementation of Alternative B when Compared to the No Project/No Action Alternative[a,b,c]

Impact	Annual Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[d]	Direct	Total[d]
Agriculture	751	1,708	36.6	59.6

[a]Average annual effect based on long-term water year average conditions.
[b]Based on changes in agricultural production (irrigated acreage) and agricultural commodity prices.
[c]IMPLAN results are changes relative to Existing Conditions or the No Project/No Action Alternative.
[d]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 2012a.

Construction, operation, and maintenance activities would affect the regional economic condition of the Extended Study Area through construction and operation expenditures; Project footprint impacts, such as removal of agricultural land from production; and other Project-related impacts. However, the magnitude of the impacts is relatively minor, when compared to the regional economy of the Extended Study Area. Therefore, additional regional economic effects related to Alternative B construction, operation, and maintenance are discussed for the Primary Study Area only.

The increase in total employment and income in the Extended Study Area would result from an increase in agricultural production. Similar to that described for Alternative A, the increase in employment and income would not be considered an adverse effect on the regional economy of the Extended Study Area. Therefore, a **less-than-significant impact** on regional economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Estimated agricultural economic changes would be driven by changes in water delivery and water quality conditions. Table 22-39 summarizes the expected changes in irrigated acreage and value of agricultural production that would result in the SWP and CVP export areas as a result of operation of Alternative B. Changes are described relative to Existing Conditions and the No Project/No Action Alternative.

Table 22-39
Change in Acres and Value of Agricultural Production Associated with Implementation of Alternative B when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Results of Alternative B	Change from Existing Conditions	Change from No Project/No Action Alternative
Long-Term Water Year Average			
Total Crop Acreage (Thousand Acres)	**7,487**	**-19**	**2**
Sacramento Valley[a]	1,908	3	0
San Joaquin[a]	5,579	-22	1
Total Value of Production (Million $)	**21,999.0**	**3,124.3**	**2.5**
Sacramento Valley	3,711.8	440.5	0.5
San Joaquin	18,287.2	2,683.8	2.0
Dry and Critical Water Year Average[b]			
Total Crop Acreage (Thousand Acres)	**7,462**	**N/A**	**8**
Sacramento Valley	1,903	N/A	4
San Joaquin	5,559	N/A	4
Total Value of Production (Million $)	**22,006.4**	**N/A**	**11.3**
Sacramento Valley	3,699.6	N/A	3.5
San Joaquin	18,306.8	N/A	7.9

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions

Notes:

N/A = not applicable

Value of production is based on prices received by farmers, in 2010 dollars.

Changes in acreage and value relative to Existing Conditions would result from a combination of Alternative B and underlying changes in land use and crop mix unrelated to Alternative B. Total value of irrigated crop production in the Extended Study Area would be expected to decline on average by more than $3.124 billion per year, with total irrigated crop acreage declining by approximately 19,000 acres. The increase in demand and subsequent real price of agricultural output for the No Project/No Action

Alternative, when compared to Existing Conditions, is the reason for the increase in total value of production, even with the decline in irrigated acres.

Changes relative to the No Project/No Action Alternative provide an estimate of the changes solely from Alternative B. Total value of irrigated crop production in the Extended Study Area would be expected to increase on average by approximately $2.5 million per year, with total irrigated crop acreage increasing by approximately 2,000 acres. In Dry and Critical water year average conditions, the value of production would be approximately $11.3 million per year higher than for the No Project/No Action Alternative Dry and Critical water year average condition.

Changes in production costs and investments are a result of, and consistent with, changes in crop acreage. Changes compared to Existing Conditions would be dominated by long-term trends in crop acreage and cropping patterns that are unrelated to Alternative B. Increases in costs and investments relative to the No Project/No Action Alternative would result from the changes in crop acreage shown in Table 22-39. Water supply and crop acreage would increase relative to the No Project/No Action Alternative, so no investments in production facilities or growing stock would be lost as a result of implementation.

Long-term average export-weighted TDS and EC would decrease if Alternative B is implemented, when compared to No Project/No Action Alternative and Existing Conditions, resulting in improved water quality for agricultural production. The economic value of the salinity change is the avoided cost of groundwater pumping. For the Extended Study Area as a whole, the value of avoided pumping as it relates to improved water quality would be approximately $0.443 million per year, when compared to No Project/No Action Alternative.

Table 22-40 summarizes the volume and cost of groundwater pumped in the Extended Study Area. Results are based on SWAP model analysis. Changes in volume and cost relative to Existing Conditions would result from a combination of Alternative B and underlying changes in land use and crop mix unrelated to Alternative B. Total volume pumped in the Extended Study Area would decline on average by almost 439 TAF per year, and total cost of pumping would increase by approximately $101 million per year. The decreased groundwater pumping would be a result of additional surface water available to agriculture in the No Project/No Action Alternative, when compared to Existing Conditions. The increase in pumping costs would be a result of the increase in real energy costs in the No Project/No Action Alternative, when compared to Existing Conditions.

Changes relative to the No Project/No Action Alternative provide an estimate of the changes solely from Alternative B. Total volume pumped in the Extended Study Area would decline on average by approximately 27 TAF per year, and total cost of pumping would decline by more than $3 million per year. The declines in pumping and cost would be larger in the Dry and Critical water year average condition.

When comparing Alternative B to Existing Conditions, changes in agricultural economics impacts would result from a combination of Alterative B and underlying changes in land use, crop mix, and real energy and agricultural commodity prices unrelated to Alternative B. Similar to that described for Alternative A, the changes that would occur solely as a result of Alternative B, an increase in the value of production and a decrease in groundwater pumping cost, are not considered an adverse effect on the agricultural economy in the Extended Study Area (Tables 22-39 and 22-40). Therefore, a **less-than-significant impact** on agricultural economics is expected, when compared to Existing Conditions.

Table 22-40
Change in Volume and Cost of Groundwater Pumping Associated with Implementation of Alternative B when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative B	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Annual Groundwater Pumped (TAF)	**6,529.2**	**-438.9**	**-27.3**
Sacramento Valley[a]	1,399.4	-129.1	-5.7
San Joaquin[a]	5,129.9	-309.9	-21.6
Annual Cost of Pumping (Million $)	**698.3**	**101.2**	**-3.3**
Sacramento Valley	116.6	12.7	-0.4
San Joaquin	581.7	12.8	-2.9
Dry and Critical Water Year Average[b]			
Annual Groundwater Pumped (TAF)	**7,177.0**	**N/A**	**-38.9**
Sacramento Valley	1,427.2	N/A	-3.8
San Joaquin	5,749.8	N/A	-35.1
Annual Cost of Pumping (Million $)	**782.4**	**N/A**	**-5.6**
Sacramento Valley	118.4	N/A	-0.3
San Joaquin	664.0	N/A	-5.3

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions.

Notes:

N/A = not applicable
TAF = thousand acre feet

Cost of pumping is based on prices received by farmers, in 2010 dollars.

When comparing Alternative B to the No Project/No Action Alternative, the increase in the value of production, along with the decrease in groundwater pumping cost, are not considered an adverse effect on the agricultural economy in the Extended Study Area (Tables 22-39 and 22-40). Therefore, a **less-than-significant impact** on agricultural economics is expected, when compared to the No Project/No Action Alternative.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

Changes in water supply reliability and related water supply costs in the Extended Study Area attributable to Alternative B operations are described relative to Existing Conditions and the No Project/No Action Alternative. This discussion focuses on the change in water supply reliability specific to urban areas in the SWP and CVP service areas, and estimates of associated changes in water supply costs.

Changes in water supply reliability and related water supply costs in the San Francisco Bay – South hydrologic region are shown in Table 22-41. Project deliveries would be expected to increase if Alternative B is implemented in long-term and Dry and Critical water year average conditions, when compared to Existing Conditions and the No Project/No Action Alternative. No water management options are included in Existing Conditions. Therefore, when comparing Alternative B with Existing Conditions, the change in management

options would always be zero or positive. When comparing Alternative B with the No Project/No Action Alternative, the increase in Project deliveries would allow for increased deliveries to carryover storage and/or not reduce the use of management options (conservation, recycling, and desalination) but would decrease the use of other supplies (transfers).

Table 22-41
Change in M&I Water Supply Deliveries and Costs for the San Francisco Bay-South Hydrologic Region Associated with Implementation of Alternative B when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative B	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Total Supply (TAF/Year)	**1,272**	**91**	**19**
Project Delivery	433	47	7
Management Options[a]	22	22	12
Other Supply	817	22	0
Total Costs (Million $/Year)	**206,324**	**36,370**	**-1,547**
Shortage	3,583	-7,047	-1,895
Supply[c]	202,741	43,418	348
Dry and Critical Water Year Average[b]			
Total Supply (TAF/Year)	**1,190**	**113**	**24**
Project Delivery	392	38	13
Management Options[a]	22	22	12
Other Supply	776	53	-1
Total Costs (Million $/Year)	**201,597**	**22,531**	**-5,258**
Shortage	9,416	-20,314	-6,342
Supply[c]	192,181	42,845	1,085

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Costs are presented in 2010 dollars.

When comparing Alternative B with Existing Conditions, supply costs would increase in the San Francisco Bay – South hydrologic region in long-term and Dry and Critical water year average conditions. The increase in supply costs would result from increases in population and real energy prices that occur in future conditions. This increase in supply cost would overwhelm any decrease in shortage costs, causing total costs to increase. When comparing Alternative B with the No Project/No Action Alternative, the additional Project deliveries, with little change in management options, would increase supply costs. However, shortage costs would decrease enough to offset the increase in supply costs, reducing total costs.

Changes in water supply reliability and related water supply costs in the South Coast hydrologic region are shown in Table 22-42. Project deliveries would be expected to increase in Alternative B in long-term and Dry and Critical water year average conditions, when compared to Existing Conditions and the No

Project/No Action Alternative. No water management options are included in Existing Conditions. Therefore, when comparing Alternative B with Existing Conditions, the change in management options would always be zero or positive. When comparing Alternative B with the No Project/No Action Alternative, the increase in Project deliveries would reduce the use of management options (conservation, recycling, and desalination) and other supply (local surface and groundwater, imported non-Project, baseline recycling and desalination, and transfers).

Table 22-42
Change in M&I Water Supply Deliveries and Costs for the South Coast Hydrologic Region Associated with Implementation of Alternative B when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative B	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Total Supply (TAF/Year)	**5,043**	**465**	**24**
Project Delivery	1,438	115	66
Management Options[a]	502	502	-8
Other Supply	3,104	-152	-34
Total Costs (Million $/Year)	**1,700,990**	**365,195**	**-62,632**
Shortage	72,857	-166,409	-36,472
Supply[c]	1,628,133	531,604	-26,160
Dry and Critical Water Year Average[b]			
Total Supply (TAF/Year)	**4,757**	**313**	**38**
Project Delivery	1,179	91	126
Management Options[a]	502	502	-8
Other Supply	3,077	-279	-80
Total Costs (Million $/Year)	**1,910,843**	**404,646**	**-127,902**
Shortage	225,830	-189,151	-76,938
Supply[c]	1,685,013	593,796	-50,964

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Costs are presented in 2010 dollars.

When comparing Alternative B with Existing Conditions, supply costs would be expected to increase in the South Coast hydrologic region in long-term and Dry and Critical water year average conditions. The increase in supply costs would result from population and real energy price increases that occur in future conditions. This increase in supply cost would overwhelm any decrease in shortage costs, causing total costs to increase. Comparing Alternative B with the No Project/No Action Alternative, the additional Project deliveries would reduce the use of management options and other supply, reducing supply costs. The accompanying reduction in shortage costs would decrease total costs.

When comparing Alternative B and Existing Conditions in the Extended Service Area outside of the San Francisco Bay – South and South Coast hydrologic regions, Project water deliveries would increase in

long-term and Dry and Critical water year average conditions, excluding the Delta. When comparing Alternative B to the No Project/No Action Alternative, Project deliveries would increase in long-term and Dry and Critical water year average conditions in most regions (Table 22-43).

Table 22-43
Change in M&I Water Supply Deliveries and Costs Modeled in OMWEM Associated with Implementation of Alternative B when Compared to Existing Conditions and the No Project/No Action Alternative

Water Delivery Region	Analysis Metric					
	Average Annual Project Water Delivery (TAF)			Average Annual Shortage and Supply Cost[c] (Thousand $)		
	Alternative B	Change from Existing Conditions	Change from the No Project/No Action Alternative	Alternative B	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average						
Delta	56	3	2	9,287	3,636	-454
Bay Area[a]	54	6	1	5,791	5,763	-69
Central Coast	47	2	2	1,634	1,579	-1,058
Sacramento Valley	23	0	0	4,503	3,340	-49
San Joaquin	104	1	4	1,613	779	-8
Southern California[b]	265	20	13	14,773	3,870	-7,723
Dry and Critical Water Year Average[d]						
Delta	44	-1	3	18,411	8,395	-1,011
Bay Area[a]	38	2	2	11,499	11,419	-240
Central Coast	27	0	4	4,522	4,369	-2,927
Sacramento Valley	21	0	0	10,986	8,054	-131
San Joaquin	81	5	8	2,836	1,194	-85
Southern California[b]	213	5	26	27,861	6,423	-19,927

[a]The results shown here are for San Benito County only.

[b]The results shown here exclude South Coast Hydrologic Area, which is shown separately.

[c]This estimate does not include all water supply-related costs. It includes annual shortage costs and supply costs that might be affected by alternatives, including transfers, groundwater pumping, or other water management options.

[d]Sacramento River 40-30-30 index.

Notes:

M&I = municipal and industrial
OMWEM = Other Municipal Water Economics Model
TAF = thousand acre feet

Costs are presented in 2010 dollars.

When comparing Alternative B and Existing Conditions, shortage and water supply costs would be expected to increase in both long-term and Dry and Critical water year average conditions. The increase in supply costs would result from population and real energy price increases that occur in future conditions. When comparing Alternative B to the No Project/No Action Alternative, shortage and water supply costs would decrease (Table 22-43). The increase in Project deliveries would reduce shortage and water supply costs.

The expected change in salinity-related costs in the Extended Study Area attributable to Alternative B operations relative to Existing Conditions and the No Project/No Action Alternative is shown in Table 22-44. Discussion in this section focuses on the change in salinity costs specific to regions with modeled salinity costs.

Table 22-44
Change in Water Supply Salinity Costs Associated with Implementation of Alternative B when Compared to the Existing Conditions and the No Project/No Action Alternative[a]

Water Delivery Service Area	Analysis Metric	Alternative B	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average				
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	233.9	-13.3	-5.9
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	59.2	-11.8	-1.5
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	252.2	-16.2	-1.6
Metropolitan Water District of Southern California	Average Annual Cost (Million $)	N/A	$536.2	-$10.8
Contra Costa and Santa Clara Water Districts		N/A	$112.8	-$1.1
Dry and Critical Water Year Average[b]				
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	298.2	-23.7	-14.8
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	80.8	-23.2	-3.1
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	273.0	-26.3	-2.4
Metropolitan Water District of Southern California	Average Annual Cost (Million $)	N/A	$542.7	-$20.4
Contra Costa and Santa Clara Water Districts		N/A	$110.0	-$1.6

[a]Results include some damages related to agricultural production in Metropolitan Water District of Southern California's Service Area.

[b]Sacramento River 40-30-30 index.

Notes:

mg/L = milligrams per liter
N/A = not applicable
TDS= total dissolved solids

Costs are presented in 2010 dollars. The Lower Colorado River Basin Water Quality Model was used for the Metropolitan Water District of Southern California service area and the South Bay Water Quality model was used for the Contra Costa and Santa Clara Water District service areas.

When comparing Alternative B with Existing Conditions, long-term average export-weighted annual TDS and chloride would be expected to decrease in long-term and Dry and Critical water year average conditions across service areas. However, average annual costs would increase. This increase is expected

due to population increases that occur in future conditions. When comparing Alternative B with the No Project/No Action Alternative, long-term average export-weighted annual TDS and chloride would decrease in long-term and Dry and Critical water year average conditions in the Metropolitan Water District of Southern California and Contra Costa and Santa Clara Water District service areas. The improvement in water quality would reduce damages in long-term and Dry and Critical water year average conditions.

When comparing Alternative B to Existing Conditions, expected changes in M&I water use economics impacts would result from a combination of Alterative B and underlying changes in population and the real cost of energy, impacting water system operation costs. Similar to that described for Alternative A, the change that would occur solely as a result of Alternative B, decreasing total costs, is not considered an adverse effect on M&I water use economics in the Extended Study Area. Therefore, a **less-than-significant impact** on M&I water use economics is expected, when compared to Existing Conditions.

When comparing Alternative B to the No Project/No Action Alternative, the expected increase in water supply and quality would decrease total costs, which is not considered an adverse effect on the M&I water use economics in the Extended Study Area. Therefore, a **less-than-significant impact** on water use economics is expected, when compared to the No Project/No Action Alternative.

22.3.7.2 Secondary Study Area – Alternative B

The operational effects within the Secondary Study Area are included in the analysis of the Extended Study Area and/or Primary Study Area, similar to that described for Alternative A.

22.3.7.3 Primary Study Area – Alternative B

Construction, Operation, and Maintenance Impacts

All Primary Study Area Project Facilities

Impact Socio-1: Substantial Adverse Effects on Regional Economics

The regional economic effects on employment and income in the Primary Study Area were evaluated during construction, operation, and maintenance. Changes are shown relative to Existing Conditions and the No Project/No Action Alternative. There is no difference between Existing Conditions and the No Project//No Action Alternative model used in the analysis. The expected effects of construction, operation, and maintenance expenditures to employment and income are shown in Table 22-45.

The Project footprint and related facilities, such as roads and utilities, would remove some existing agricultural land from production, so the effects on employment and income would be negative. Some agricultural land removed from production would only be temporary, and restored to its original use following the construction period.

Alternative B would also increase economic activity related to land acquisition in the Primary Study Area. This regional economic impact would be temporary, occurring 12 to 18 months prior to construction. The regional economic effects to employment and income in the Primary Study Area from land acquisition are reported in Table 22-45.

Table 22-45
Temporary Change in Regional Employment and Income Associated with Implementation of Alternative B when Compared to the No Project/No Action Alternative[a,b]

Impact	Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[c]	Direct	Total[c]
Agriculture	-636	-1,242	-44.0	-62.2
Land Acquisition	615	706	14.4	17.2
Construction	20,518	45,253	98.7	631.7
Total	**20,497**	**44,717**	**69.1**	**586.7**

[a]Average annual effect based on entire period of construction. The duration of each impact would vary.
[b]IMPLAN results are changes relative to Existing Condition and the No Project/No Action Alternative.
[c]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 2012a.

The expected permanent effects to employment and income from Alternative B operation and maintenance are shown in Table 22-46. The Project would also increase recreational opportunities in the Primary Study Area. The increased recreational expenditures would affect employment and income. The regional economic effects to employment and income in the Primary Study Area from the increase in recreational expenditures are reported in Table 22-46.

Table 22-46
Permanent Change in Regional Employment and Income Associated with Implementation of Alternative B when Compared to the No Project/No Action Alternative[a,b]

Impact	Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[c]	Direct	Total[c]
Recreation	483	583	19.9	22.7
Agriculture	-199	-372	-4.6	-9.7
Operation	1,500	1,838	30.0	39.7
Total	**1,784**	**2,049**	**45.3**	**52.7**

[a]Average annual effect based over life of Alternative B.
[b]IMPLAN results are changes relative to Existing Conditions and the No Project/No Action Alternative.
[c]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 2012a.

Total employment and income in the Primary Study Area would increase as a result of construction, operation, land acquisition, and a change in agricultural production and recreational opportunities. Similar to that described for Alternative A, the increase in employment and income would not be considered an adverse effect on the regional economy of the Primary Study Area. Therefore, a **less-than-significant impact** on regional economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-2: Substantial Adverse Effects on Population and Housing

Population

Construction and operation of Alternative B would require an estimated annual average of 99 and 30 workers, respectively, with a maximum of 60 daily workers for operation. It is anticipated that approximately 50 percent of the construction jobs would be filled from within the existing two-county labor force. However, construction may require specialized worker skills not readily available in the local labor pool. As a result, it is anticipated that some of the non-local workers would be imported from outside the two-county region.

When considering the multi-year duration of construction, it is anticipated that 20 percent of the imported workers would relocate to the two-county region, adding to the local population. It is anticipated that all of the workers required for operation would relocate to the two-county region. Similar to that described for Alternative A, this additional population from construction and operation would constitute a minor increase in the total 2020 projected regional population of 64,605, and would not pose a burden on local public services, utilities, or infrastructure. Therefore, impacts are considered **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Housing

Alternative B construction, operation, and maintenance impacts to housing conditions within the Primary Study Area would be the same as described for Alternative A.

Impact Socio-3: Substantial Adverse Effects on Local Government Fiscal Conditions

Alternative B construction, operation, and maintenance impacts to local government fiscal conditions within the Primary Study Area would be the same as described for Alternative A.

Impact Socio-4: Substantial Adverse Effects on Recreation Economics

Alternative B would provide recreational opportunities within the Primary Study Area. Table 22-47 shows the estimated number of visitors to Sites Reservoir if Alternative B is implemented. Also included are recreation expenditures attributable to the portion of visitors outside the Primary Study Area. This recreation expenditure information is used to assess the effects on regional economics, i.e., the impact on employment and income. Anticipated total recreation visitation to Sites Reservoir would be more than 360,000 annual visits, increasing recreation expenditures from outside of the Primary Study Area by almost $3 million.

Increased levels of recreation at the Sites Reservoir would increase recreation expenditures in the Primary Study Area. Similar to that described for Alternative A, an increase in recreation expenditures is not considered an adverse effect on the recreation economy of the Primary Study Area. Therefore, a **less-than-significant impact** on recreation economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Table 22-47
Estimated Sites Reservoir Recreation Visitation and Expenditures Associated with Implementation of Alternative B*

Activity / Spending Category	Alternative B	
	Visits (Recreation Visitor Days)	Associated Non-Local Spending
Shore fishing	31,150	$213,096
Boat fishing	16,112	$110,222
Picnicking	82,351	$686,480
Sightseeing	70,894	$600,656
Swimming / beach use	80,919	$674,542
Walking	10,383	$74,187
Bicycling	4,655	$33,256
Boating / water-skiing	55,856	$465,613
Other	2,864	$23,878
Total	**355,184**	**$2,881,930**

*Based on long-term water year average conditions.

Notes:

Costs are presented in 2010 dollars.

Attributed to reservoir-recreation only; the analysis does not account for changes in recreation spending attributed to river-based recreation.

Source: Pavich, 2012b.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Construction of Alternative B would convert land from existing agricultural uses to uses that include direct Project facility footprints, construction staging areas, temporary and permanent roads, utilities, and open space undeveloped lands.

Changes in crop acreage were used to describe the associated changes in economic values. Table 22-48 summarizes the expected changes in acreage and value of agricultural production that would result in the Primary Study Area as a result of Alternative B construction. Changes are shown relative to Existing Conditions and the No Project/ No Action Alternative by aggregate crop category (agricultural resources do not differ between Existing Conditions and the No Project/No Action Alternative).

Total value of crop production in the Primary Study Area would be expected to decline on average by $7.1 million per year during the Project construction period, and by $1.5 million per year during Project operation. Total crop acreage would decline by approximately 4,500 acres during Project construction (temporary change) and 26,100 acres during Project operation (permanent change). The majority of the decrease in crop acreage during construction would be associated with rice and almost all of the decrease in crop acreage during Project operation would be associated with rangeland.

Alternative B may also affect production costs on lands even if revenues are largely unaffected. Costs could be associated with operational constraints and longer travel times due to construction. Construction designs and costs have provided for such effects in two ways. In most cases, affected lands would be within the Project facilities footprint, and are included in the agricultural acreage and value of production described elsewhere in this chapter. For potentially affected lands not included in the facilities footprint, construction costs include temporary and permanent roads and other facilities as needed to support

agricultural lands. There could be some additional travel time and other costs associated with using these facilities, but such costs are not environmental impacts requiring mitigation.

Loss of investments in production facilities would occur as a result of facilities construction. The value of structures and equipment potentially affected would vary widely across parcels. Much of the equipment is portable (e.g., machinery, tools, portable sprinkler pipe), and could be sold or used on other lands. Shop and storage buildings and permanent irrigation and drainage equipment may have little or no salvage value. The negotiated purchase of lands for the conveyance and associated facilities would compensate for salvage value accordingly. According to Cooperative Extension cost of production studies, permanent structures, irrigation systems, and drainage systems can represent a wide range in investment, from less than $100 per acre for field and vegetable crops up to over $3,000 per acre for some orchards (UCCE, 2008 and 2011). Most such facilities would not be new, so their depreciated values would be substantially lower.

Table 22-48
Change in Crop Acres and Value of Agricultural Production Associated with Implementation of Alternative B when Compared to Existing Conditions and No Project/No Action Alternative

Analysis Metric	Alternative B Baseline[b]	Change from Existing Conditions and the No Project/No Action Alternative	
		Temporary[c]	Permanent[c]
Total Crop Acreage (Thousand acres)[a]	**889.4**	**-4.5**	**-26.1**
Rice	247.2	-3.1	-0.2
Almonds	109.4	-0.1	0.0
Hay and Forage	94.3	-0.2	-0.6
Wheat	22.5	-0.3	-0.1
Tomatoes, Processing	27.9	-0.1	-0.1
Rangeland	388.1	-0.7	-25.3
Total Value of Production (Million $)[a]	**1,047.9**	**-7.1**	**-1.5**
Rice	486.2	-5.8	-0.3
Almonds	359.3	-0.5	0.0
Hay and Forage	90.9	-0.2	-0.6
Wheat	12.8	-0.2	0.0
Tomatoes, Processing	95.5	-0.4	-0.3
Rangeland	3.1	-0.1	-0.3

[a]Total crop acreage and value of production differ from the sum of individual categories due to rounding.

[b]Permanent impacts of Alternative A.

[c]Temporary impacts are a result of Project construction. Permanent impacts are a result of Project operation.

Note:

Value of production is based on prices received by farmers, in 2010 dollars.

Source: Pavich, 2012c.

Land improvements, including orchards, would also be considered during negotiations for land purchases. Typical investments required to bring permanent crops into production were described in Section 22.2. Forage crops, such as irrigated pasture and alfalfa, require an establishment cost of approximately $400 per acre. The depreciated values of the growing stock could be substantially below these establishment costs, depending on the ages of the stands that would be affected.

Construction and operation of Alternative B would reduce the total value of agricultural production in the Primary Study Area. DWR and Reclamation would provide compensation to property owners for the fair market value of any property acquired through eminent domain for the Project. Similar to that described for Alternative A, the expected decrease in the total value of agricultural production would be less than five percent of the total value of agricultural production in the Primary Study Area. Therefore, a **less-than-significant impact** is expected to the agricultural economy in the Primary Study Area, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

Refer to the **Impact Socio-6** discussion for the Extended Study Area. That discussion also applies to the Primary Study Area.

22.3.8 Impacts Associated with Alternative C

22.3.8.1 Extended Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

Hydrologic Regions, Water Delivery Regions, and Water Delivery Service Areas

The impacts associated with Alternative C, as they relate to population and housing (**Impact Socio-2**), local government fiscal conditions (**Impact Socio-3**), and recreation economics (**Impact Socio-4**), would be the same as described for Alternative A for the Extended Study Area.

The operational differences for Alternative C within the Extended Study Area, when compared to Alternative A, for the effects on regional economics (**Impact Socio-1**), agricultural economics (**Impact Socio-5**), and M&I water use economics (**Impact Socio-6**) are discussed below.

Impact Socio-1: Substantial Adverse Effects on Regional Economics

Agricultural production in the Extended Study Area would be expected to change from operation of Alternative C and the resulting changes to SWP and CVP project deliveries, impacting employment and income. The estimated change in agricultural production is discussed in effects on agricultural economics (Impact Socio-5). The regional economic effects on employment and income from a change in agricultural production during Project construction, operation, and maintenance would not differ between Existing Conditions and the No Project/No Action Alternative Table 22-49.

The expected increased reliability associated with Alternative C water deliveries would increase agricultural production in the Extended Study Area less than one percent. This, is turn, would increase annual employment by approximately 77 individuals and annual labor income by more than $2.1 million.

Construction, operation, and maintenance activities would affect the regional economic condition of the Extended Study Area through construction and operation expenditures; Project footprint impacts, such as removal of agricultural land from production; and other Project-related impacts. However, the magnitude of the impacts is relatively minor when compared to the regional economy of the Extended Study Area. Therefore, additional regional economic effects related to Alternative C construction, operation, and maintenance are discussed for the Primary Study Area only.

Table 22-49
Change in Extended Study Area Regional Employment and Income Associated with Implementation of Alternative C when Compared to the No Project/No Action Alternative[a,b,c]

Impact	Annual Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[d]	Direct	Total[d]
Agriculture	918	2,176	47.3	77.3

[a]Average annual effect based on long-term water year average conditions.
[b]Based on changes in agricultural production (irrigated acreage) and agricultural commodity prices.
[c]IMPLAN results are changes relative to Existing Condition and the No Project/No Action Alternative.
[d]Includes direct, indirect, and induced effects defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 2012a.

The expected increase in total employment and income in the Extended Study Area would result from an increase in agricultural production. Similar to that described for Alternative A, the increase in employment and income would not be considered an adverse effect on the regional economy of the Extended Study Area. Therefore, a **less-than-significant impact** on regional economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Estimated agricultural economic changes would be driven by changes in water delivery and water quality conditions. Table 22-50 summarizes the expected changes in irrigated acreage and value of agricultural production that would result in the SWP and CVP export areas as a result of operation of Alternative C. Changes are described relative to Existing Conditions and the No Project/No Action Alternative.

Expected changes in acreage and value relative to Existing Conditions would result from a combination of Alternative C and underlying changes in land use and crop mix unrelated to Alternative C. Total value of irrigated crop production in the Extended Study Area would decline on average by over $3.125 billion per year, with total irrigated crop acreage declining by approximately 18,000 acres. The increase in demand and subsequent real price of agricultural output for the No Project/No Action Alternative, when compared to Existing Conditions, is the reason for the increase in total value of production, even with the decline in irrigated acres.

Changes relative to the No Project/No Action Alternative provide an estimate of the changes solely from Alternative C. Total value of irrigated crop production in the Extended Study Area would be expected to increase on average by approximately $4.1 million per year, with total irrigated crop acreage increasing by approximately 2,000 acres. In Dry and Critical water year average conditions, the value of production would be approximately $21 million per year higher than in the No Project/No Action Alternative Dry and Critical water year average condition.

Changes in production costs and investments are a result of, and consistent with, changes in crop acreage. Expected changes compared to Existing Conditions are dominated by long-term trends in crop acreage and cropping patterns that are unrelated to Alternative C. Increases in costs and investments relative to the No Project/No Action Alternative would result from the changes in crop acreage shown in Table 22-50. Water

supply and crop acreage would increase relative to the No Project/No Action Alternative, so no investments in production facilities or growing stock would be lost as a result of implementation.

Table 22-50
Change in Acres and Value of Agricultural Production Associated with Implementation of Alternative C when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Total Crop Acreage (Thousand Acres)	**7,488**	**-18**	**2**
Sacramento Valley[a]	1,909	3	1
San Joaquin[a]	5,579	-22	2
Total Value of Production (Million $)	**22,000.7**	**3,125.9**	**4.1**
Sacramento Valley	3,713.6	442.3	2.3
San Joaquin	18,287.0	2,683.6	1.8
Dry and Critical Water Year Average[b]			
Total Crop Acreage (Thousand Acres)	**7,468**	**N/A**	**15**
Sacramento Valley	1,905	N/A	5
San Joaquin	5,564	N/A	9
Total Value of Production (Million $)	**22,016.5**	**N/A**	**21.4**
Sacramento Valley	3,702.6	N/A	6.5
San Joaquin	18,313.9	N/A	14.9

[a]Water delivery region.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions.

Notes:

N/A = not applicable

Value of production is based on prices received by farmers, in 2010 dollars.

Long-term average export-weighted TDS and EC would be expected to decrease if Alternative C is implemented, when compared to No Project/No Action Alternative and Existing Conditions, resulting in improved water quality for agricultural production. The economic value of the salinity change is the avoided cost of groundwater pumping. For the Extended Study Area as a whole, the value of avoided pumping as it relates to improved water quality would be approximately $0.616 million per year, when compared to the No Project/No Action Alternative.

Table 22-51 summarizes the volume and cost of groundwater pumped in the Extended Study Area. Results are based on SWAP model analysis. Changes in volume and cost relative to Existing Conditions would result from a combination of Alternative C and underlying changes in land use and crop mix unrelated to Alternative C. Total volume pumped in the Extended Study Area would decline on average by almost 455 TAF per year, and total cost of pumping would increase by approximately $99 million per year. The decreased groundwater pumping would be a result of additional surface water available to agriculture in the No Project/No Action Alternative, when compared to Existing Conditions. The increase in pumping costs would be a result of the increase in real energy costs in the No Project/No Action Alternative, when compared to Existing Conditions.

Table 22-51
Change in Volume and Cost of Groundwater Pumping Associated with Implementation of Alternative C when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Annual Groundwater Pumped (TAF)	**6,513.5**	**-454.7**	**-43.0**
Sacramento Valley[a]	1,396.5	-131.9	-8.5
San Joaquin[a]	5,116.9	-322.8	-34.5
Annual Cost of Pumping (Million $)	**695.8**	**98.7**	**-5.8**
Sacramento Valley	116.4	12.5	-0.6
San Joaquin	579.4	86.3	-5.2
Dry and Critical Water Year Average[b]			
Annual Groundwater Pumped (TAF)	**7,155.2**	**N/A**	**-60.8**
Sacramento Valley	1,418.6	N/A	-12.4
San Joaquin	5,736.5	N/A	-48.4
Annual Cost of Pumping (Million $)	**780.1**	**N/A**	**-7.9**
Sacramento Valley	117.9	N/A	-0.8
San Joaquin	662.3	N/A	-7.0

[a]Water delivery regions.

[b]The Existing Conditions SWAP model run is based on long-term water year average conditions and does not report Dry and Critical water year average conditions.

Notes:

N/A = not applicable
TAF = thousand acre feet

Cost of pumping is based on prices received by farmers, in 2010 dollars.

Changes relative to the No Project/No Action Alternative provide an estimate of the changes solely from Alternative C. Total volume pumped in the Extended Study Area would be expected to decline on average by approximately 43 TAF per year, and total cost of pumping would decline by approximately $6 million per year. The declines in pumping and cost would be larger in the Dry and Critical water year average condition.

When comparing Alternative C to Existing Conditions, expected changes in agricultural economics impacts would result from a combination of Alterative C and underlying changes in land use, crop mix, and real energy and agricultural commodity prices unrelated to Alternative C. Similar to that described for Alternative A, the changes that would occur solely as a result of Alternative C, i.e., an increase in the value of production and a decrease in groundwater pumping cost, are not considered an adverse effect on the agricultural economy in the Extended Study Area (Tables 22-50 and 22-51). Therefore, a **less-than-significant impact** on agricultural economics is expected, when compared to Existing Conditions.

When comparing Alternative C to the No Project/No Action Alternative, the expected increase in the value of production along with the decrease in groundwater pumping cost are not considered an adverse effect on the agricultural economy in the Extended Study Area (Tables 22-50 and 22-51). Therefore, a **less-than-significant impact** on agricultural economics is expected, when compare to the No Project/No Action Alternative.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

Changes in water supply reliability and related water supply costs in the Extended Study Area attributable to Alternative C operations are described relative to Existing Conditions and No Project/No Action

Alternative. Discussion in this section focuses on the change in water supply reliability specific to urban areas in the SWP and CVP service areas, and estimates of associated changes in water supply costs.

Expected changes in water supply reliability and related water supply costs in the San Francisco Bay – South hydrologic region are shown in Table 22-52. Project deliveries would increase in Alternative C in long-term and Dry and Critical water year average conditions, when compared to Existing Conditions and the No Project/No Action Alternative. No water management options are included in Existing Conditions. Therefore, when comparing Alternative C with Existing condition, the change in management options would always be zero or positive. When comparing Alternative C with the No Project/No Action Alternative, the increase in Project deliveries would allow for increased deliveries to carryover storage and/or not reduce the use of management options (conservation, recycling, and desalination) but would decrease use of other supplies (transfers).

Table 22-52
Change in M&I Water Supply Deliveries and Costs for the San Francisco Bay-South Hydrologic Region Associated with Implementation of Alternative C when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Total Supply (TAF/Year)	**1,274**	**93**	**21**
Project Delivery	435	49	9
Management Options[a]	22	22	12
Other Supply	817	22	0
Total Costs (Million $/Year)	**206,067**	**36,113**	**-1,804**
Shortage	3,341	-7,289	-2,137
Supply[c]	202,726	43,402	333
Dry and Critical Water Year Average[b]			
Total Supply (TAF/Year)	**1,195**	**117**	**28**
Project Delivery	397	43	18
Management Options[a]	22	22	12
Other Supply	776	52	-2
Total Costs (Million $/Year)	**201,273**	**22,206**	**-5,582**
Shortage	9,282	-20,449	-6,477
Supply[c]	191,991	42,655	895

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Costs are presented in 2010 dollars.

When comparing Alternative C with Existing Conditions, supply costs would increase in the San Francisco Bay – South hydrologic region in long-term and Dry and Critical water year average conditions. The increase in supply costs would result from increases in population and real energy prices that occur in future conditions. This increase in supply cost would overwhelm any decrease in shortage costs, causing total costs to increase. When comparing Alternative C with the No Project/No Action Alternative, the additional Project deliveries, with little change in management options, would increase

supply costs. However, shortage costs would decrease enough to offset the increase in supply costs, reducing total costs.

Expected changes in water supply reliability and related water supply costs in the South Coast hydrologic region are shown in Table 22-53. Project deliveries would increase in Alternative C in long-term and Dry and Critical water year average conditions, when compared to Existing Conditions and the No Project/No Action Alternative. No water management options are included in Existing Conditions. Therefore, when comparing Alternative C with Existing Conditions, the change in management options would always be zero or positive. When comparing Alternative C with the No Project/No Action Alternative, the increase in Project deliveries would reduce the use of management options (conservation, recycling, and desalination) and other supply (local surface water and groundwater, imported non-Project water, baseline recycling and desalination, and transfers).

Table 22-53
Change in M&I Water Supply Deliveries and Costs for the South Coast Hydrologic Region Associated with Implementation of Alternative C when Compared to Existing Conditions and the No Project/No Action Alternative

Analysis Metric	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average			
Total Supply (TAF/Year)	**5,043**	**464**	**23**
Project Delivery	1,440	117	68
Management Options[a]	500	500	-10
Other Supply	3,103	-153	-35
Total Costs (Million $/Year)	**1,698,063**	**362,267**	**-65,559**
Shortage	68,089	-171,177	-41,241
Supply[c]	1,629,974	533,445	-24,319
Dry and Critical Water Year Average[b]			
Total Supply (TAF/Year)	**4,775**	**331**	**56**
Project Delivery	1,199	111	146
Management Options[a]	500	500	-10
Other Supply	3,076	-280	-81
Total Costs (Million $/Year)	**1,884,947**	**378,750**	**-153,798**
Shortage	197,360	-217,620	-105,408
Supply[c]	1,687,587	596,371	-48,390

[a]Management options include conservation, recycling, and desalinization.

[b]Sacramento River 40-30-30 index.

[c]This estimate does not include all water supply-related costs. It includes annual costs that might be affected by alternatives including conveyance, distribution, treatment, and transfers.

Notes:

M&I = municipal and industrial
TAF = thousand acre feet

Costs are presented in 2010 dollars.

When comparing Alternative C with Existing Conditions, supply costs would be expected to increase in the South Coast hydrologic region in long-term and Dry and Critical water year average conditions. The

increase in supply costs would result from population and real energy price increases that occur in future conditions. This increase in supply cost would overwhelm any decrease in shortage costs, causing total costs to increase. When comparing Alternative C with the No Project/No Action Alternative, the additional Project deliveries would reduce the use of management options and other supply, reducing supply costs. The accompanying reduction in shortage costs would decrease total costs.

When comparing Alternative C and Existing Conditions in the Extended Service Area outside of the San Francisco Bay – South and South Coast hydrologic regions, Project water deliveries would be expected to increase in long-term and Dry and Critical water year average conditions, excluding the Delta. When comparing Alternative C to the No Project/No Action Alternative, Project deliveries would increase in long-term and Dry and Critical water year average conditions (Table 22-54).

Table 22-54
Change in M&I Water Supply Deliveries and Costs Modeled in OMWEM Associated with Implementation of Alternative C when Compared to Existing Conditions and the No Project/No Action Alternative

Water Delivery Region	Analysis Metric					
	Average Annual Project Water Delivery (TAF)			Average Annual Shortage and Supply Cost[c] (Thousand $)		
	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average						
Delta	56	3	2	9,222	3,571	-519
Bay Area[a]	54	7	2	5,671	5,642	-189
Central Coast	47	2	2	1,358	1,303	-1,334
Sacramento Valley	23	0	0	4,415	3,252	-138
San Joaquin	104	2	5	1,592	757	-29
Southern California[b]	266	20	14	13,629	2,727	-8,866
Dry and Critical Water Year Average[d]						
Delta	45	0	4	18,170	8,154	-1,252
Bay Area[a]	39	3	3	11,263	11,183	-476
Central Coast	28	1	4	3,758	3,604	-3,691
Sacramento Valley	21	0	0	10,761	7,829	-356
San Joaquin	83	7	10	2,796	1,154	-125
Southern California[b]	218	10	32	23,930	2,491	-23,858

[a]The results shown here are for San Benito County only.

[b]The results shown here exclude South Coast Hydrologic Area, which is shown separately.

[c]This estimate does not include all water supply-related costs. It includes annual shortage costs and supply costs that might be affected by alternatives, including transfers, groundwater pumping, or other water management options.

[d]Sacramento River 40-30-30 index.

Notes:

M&I = municipal and industrial
OMWEM = Other Municipal Water Economics Model
TAF = thousand acre feet

Costs are presented in 2010 dollars.

When comparing Alternative C and Existing Conditions, shortage and water supply costs would be expected to increase in both long-term and Dry and Critical water year average conditions. The increase in supply costs would result from population and real energy price increases that occur in future conditions. When comparing Alternative C to the No Project/No Action Alternative, shortage and water supply costs would decrease (Table 22-54). The increase in Project deliveries would reduce shortage and water supply costs.

The expected change in salinity-related costs in the Extended Study Area attributable to Alternative C operations relative to Existing Conditions and the No Project/No Action Alternative is shown in Table 22-55. Discussion in this section focuses on the change in salinity costs specific to regions with modeled salinity costs.

Table 22-55
Change in Water Supply Salinity Costs Associated with Implementation of Alternative C when Compared to Existing Conditions and the No Project/No Action Alternative[a]

Water Delivery Service Area	Analysis Metric	Alternative C	Change from Existing Conditions	Change from the No Project/No Action Alternative
Long-Term Water Year Average				
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	232.0	-15.2	-7.8
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	58.6	-12.4	-2.0
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	251.6	-16.8	-2.3
Metropolitan Water District of Southern California	Average Annual Cost (Million $)	N/A	$534.2	-$12.9
Contra Costa and Santa Clara Water Districts		N/A	$112.4	-$1.5
Dry and Critical Water Year Average[b]				
Metropolitan Water District of Southern California	Long-Term Average Export-Weighted Annual TDS (mg/L)	295.1	-26.8	-17.9
Contra Costa and Santa Clara Water Districts	Average Annual Chloride (mg/L)	80.4	-23.6	-3.5
Contra Costa and Santa Clara Water Districts	Long-Term Average Export-Weighted Annual TDS (mg/L)	272.7	-26.6	-2.7
Metropolitan Water District of Southern California	Average Annual Cost (Million $)	N/A	$539.6	-$23.5
Contra Costa and Santa Clara Water Districts		N/A	$109.8	-$1.9

[a]Results include some damages related to agricultural production in Metropolitan Water District of Southern California's Service Area.

[b]Sacramento River 40-30-30 index.

Notes:

mg/L = milligrams per liter
N/A = not applicable
TDS= total dissolved solids

Costs are presented in 2010 dollars. The Lower Colorado River Basin Water Quality Model was used for the Metropolitan Water District of Southern California service area and the South Bay Water Quality model was used for the Contra Costa and Santa Clara Water District service areas.

When comparing Alternative C with Existing Conditions, long-term average export-weighted annual TDS and chloride would be expected to decrease in long-term and Dry and Critical water year average conditions across service areas. However, average annual costs would increase. This increase is expected due to population increases that occur in future conditions. When comparing Alternative C with the No Project/No Action Alternative, long-term average export-weighted annual TDS and chloride would decrease in long-term and Dry and Critical water year average conditions in the Metropolitan Water District of Southern California and Contra Costa and Santa Clara Water District service areas. The improvement in water quality would reduce damages in long-term and Dry and Critical water year average conditions.

When comparing Alternative C to Existing Conditions, expected changes in M&I water use economics impacts would result from a combination of Alterative C and underlying changes in population and the real cost of energy, impacting water system operation costs. Similar to that described for Alternative A, the change that would occur solely as a result of Alternative C, i.e., decreases in total costs, is not considered an adverse effect on M&I water use economics in the Extended Study Area. Therefore, a **less-than-significant impact** on M&I water use economics is expected, when compared to Existing Conditions.

When comparing Alternative C to the No Project/No Action Alternative, the expected increase in water supply and quality would decrease total costs, which is not considered an adverse effect on the M&I water use economics in the Extended Study Area. Therefore, a **less-than-significant impact** on water use economics is expected, when compared to the No Project/No Action Alternative.

22.3.8.2 Secondary Study Area – Alternative C

The operational effects within the Secondary Study Area are included in the analysis of the Extended Study Area and/or Primary Study Area, similar to that described for Alternative A.

22.3.8.3 Primary Study Area – Alternative C

Construction, Operation, and Maintenance Impacts

All Primary Study Area Project Facilities

Impact Socio-1: Substantial Adverse Effects on Regional Economics

The regional economic effects on employment and income in the Primary Study Area were evaluated during Project construction, operation, and maintenance. Changes are shown relative to Existing Conditions and the No Project/No Action Alternative. There is no difference between Existing Conditions and the No Project/No Action Alternative model used in the analysis. The expected effects of construction, operation, and maintenance expenditures to employment and income are shown in Table 22-56.

The Project footprint and related facilities, such as roads and utilities, would remove some existing agricultural land from production, so the effects on employment and income would be negative. Some agricultural land removed from production would only be temporary, and restored to its original use following the construction period.

Table 22-56
Temporary Change in Regional Employment and Income Associated with Implementation of Alternative C when Compared to the No Project/No Action Alternative[a,b]

Impact	Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[c]	Direct	Total[c]
Agriculture	-636	-1,242	-44.0	-62.2
Land Acquisition	625	717	14.7	17.5
Construction	22,219	49,441	106.9	693.3
Total	**22,208**	**48,916**	**77.6**	**648.6**

[a]Average annual effect based on entire period of construction. The duration of each impact will vary.
[b]IMPLAN results are changes relative to Existing Conditions and the No Project/No Action Alternative.
[c]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 2012a.

Alternative C would increase economic activity related to land acquisition in the Primary Study Area. This regional economic impact would be temporary, occurring 12 to 18 months prior to construction. The regional economic effects to employment and income in the Primary Study Area from land acquisition are reported in Table 22-56.

The expected permanent effects to employment and income from operation and maintenance are shown in Table 22-57. Alternative C would also increase recreational opportunities in the Primary Study Area. The increased recreational expenditures would affect employment and income. The regional economic effects to employment and income in the Primary Study Area from the increase in recreational expenditures are reported in Table 22-57.

Table 22-57
Permanent Change in Regional Employment and Income Associated with Implementation of Alternative C when Compared to the No Project/No Action Alternative[a,b]

Impact	Labor Income (Thousand $)		Annual Jobs	
	Direct	Total[c]	Direct	Total[c]
Recreation	504	608	20.8	23.7
Agriculture - Permanent	-204	-381	-4.7	-9.9
Operation	1,750	2,120	35.0	45.7
Total	**2,050**	**2,347**	**51.1**	**59.5**

[a]Average annual effect based over life of Alternative C.
[b]IMPLAN results are changes relative to Existing Condition and the No Project/No Action Alternative.
[c]Includes direct, indirect, and induced effects (defined in Appendix 22C).

Note:
Income is reported 2010 dollars.

Source: Pavich, 20112a.

Total employment and income in the Primary Study Area would increase as a result of construction, operation, land acquisition, and a change in agricultural production and recreational opportunities. The increase in employment and income would not be considered an adverse effect on the regional economy

of the Primary Study Area. Therefore, a **less-than-significant impact** on regional economics is expected, similar to that described for Alternative A.

Impact Socio-2: Substantial Adverse Effects on Population and Housing

Population

Construction and operation of Alternative C would require an estimated annual average of 107 and 35 workers, respectively, with a maximum of 60 daily workers for operation. It is anticipated that approximately 50 percent of the construction jobs would be filled from within the existing two-county labor force. However, construction may require specialized worker skills not readily available in the local labor pool. As a result, it is anticipated that some of the non-local workers would be imported from outside the two-county region.

Considering the multi-year duration of construction, it is anticipated that 20 percent of the imported workers would relocate to the two-county region, adding to the local population. It is anticipated that all of the workers required for operation would relocate to the two-county region. Similar to that described for Alternative A, this additional population from construction and operation would constitute a minor increase in the total 2020 projected regional population of 64,605, and would not pose a burden on local public services, utilities, or infrastructure. Therefore, impacts are considered **less than significant**, when compared to Existing Conditions and the No Project/No Action Alternative.

Housing

Alternative C construction, operation, and maintenance impacts to housing conditions within the Primary Study Area would be the same as described for Alternative A.

Impact Socio-3: Substantial Adverse Effects on Local Government Fiscal Conditions

Alternative C construction, operation, and maintenance impacts to local government fiscal conditions within the Primary Study Area would be the same as described for Alternative A.

Impact Socio-4: Substantial Adverse Effects on Recreation Economics

Alternative C would provide recreational opportunities within the Primary Study Area. Table 22-58 shows the estimated number of visitors to Sites Reservoir if Alternative C is implemented. Also included are recreation expenditures attributable to the portion of visitors outside the Primary Study Area. This recreation expenditure information is used to assess the effects on regional economics, i.e., the impact on employment and income. Anticipated total recreation visitation would be more than 370,000 annual visits, increasing recreation expenditures from outside the Primary Study Area by more than $3 million.

Increased levels of recreation at the Sites Reservoir would increase recreation expenditures in the Primary Study Area. An increase in recreation expenditures is not considered an adverse effect on the recreation economy of the Primary Study Area. Therefore, a **less-than-significant impact** on recreation economics is expected, when compared to Existing Conditions and the No Project/No Action Alternative.

Table 22-58
Estimated Sites Reservoir Recreation Visitation and Expenditures Associated with Implementation of Alternative C*

Activity / Spending Category	Alternative C	
	Visits (Recreation Visitor Days)	Associated Non-Local Spending
Shore fishing	32,508	$222,386
Boat fishing	16,815	$115,027
Picnicking	85,941	$716,409
Sightseeing	73,984	$626,843
Swimming / beach use	84,447	$703,949
Walking	10,836	$77,422
Bicycling	4,858	$34,706
Boating / water-skiing	58,291	$485,912
Other	2,989	$24,919
Total	**370,669**	**$3,007,573**

*Based on long-term water year conditions.

Note:
Costs are presented in 2010 dollars. Spending attributed to reservoir-recreation only; the analysis does not account for changes in recreation spending attributed to river-based recreation.

Source: Pavich, 2012b.

Impact Socio-5: Substantial Adverse Effects on Agricultural Economics

Construction of Alternative C would convert land from existing agricultural uses to uses that include Project facility footprints, construction staging areas, temporary and permanent roads, utilities, and open space undeveloped lands.

Changes in crop acreage were used to describe the associated changes in economic values. Table 22-59 summarizes the expected changes in acreage and value of agricultural production that would result in the Primary Study Area as a result of Alternative C construction. Changes are shown relative to Existing Conditions and the No Project/ No Action Alternative; by aggregate crop category (agricultural resources do not differ between Existing Conditions and the No Project/No Action Alternative).

Total value of crop production in the Primary Study Area would be expected to decline on average by $7.1 million per year during the Project construction period, and by $1.5 million per year during Project operation. Total crop acreage would decline by approximately 4,500 acres during Project construction (temporary change) and 26,200 acres during Project operation (permanent change). The majority of the decrease in crop acreage during construction would be associated with rice and almost all of the decrease in crop acreage during Project operation would be associated with rangeland.

Alternative C may also affect production costs on lands even if revenues are largely unaffected. Costs could be associated with operational constraints and longer travel times due to Project construction. Construction designs and costs have provided for such effects in two ways. In most cases, affected lands fall within the Project facilities footprint, and are included in the agricultural acreage and value of production described elsewhere in this chapter. For potentially affected lands not included in the facilities footprint, construction costs include temporary and permanent roads and other facilities as needed to

support agricultural production. There could be some additional travel time and other costs associated with using these facilities, but such costs are not environmental impacts requiring mitigation.

Table 22-59
Change in Crop Acres and Value of Agricultural Production Associated with Implementation of Alternative C when Compared to Existing Conditions and No Project/No Action Alternative

Analysis Metric	Alternative C Baseline[b]	Change from Existing Conditions and No Action Alternative	
		Temporary[c]	Permanent[c]
Total Crop Acreage (Thousand acres)[a]	**889.3**	**-4.5**	**-26.2**
Rice	247.2	-3.1	-0.2
Almonds	109.4	-0.1	0.0
Hay and Forage	94.3	-0.2	-0.6
Wheat	22.5	-0.3	-0.1
Tomatoes, Processing	27.9	-0.1	-0.1
Rangeland	388.1	-0.7	-25.3
Total Value of Production (Million $)[a]	**1,047.9**	**-7.1**	**-1.5**
Rice	486.2	-5.8	-0.3
Almonds	359.3	-0.5	-0.1
Hay and Forage	90.9	-0.2	-0.6
Wheat	12.8	-0.2	0.0
Tomatoes, Processing	95.5	-0.4	-0.3
Rangeland	3.1	-0.1	-0.3

[a]Total crop acreage and value of production differ from the sum of individual categories due to rounding.
[b]Permanent impacts of Alternative A.
[c]Temporary impacts are a result of Project construction. Permanent impacts are a result of Project operation.

Note:
Value of production is based on prices received by farmers, in 2010 dollars.

Source: Pavich, 2012c.

Loss of investments in production facilities would occur as a result of facilities construction. The value of structures and equipment potentially affected would vary widely across parcels. Much of the equipment is portable (e.g., machinery, tools, portable sprinkler pipe), and could be sold or used on other lands. Shop and storage buildings and permanent irrigation and drainage equipment may have little or no salvage value. The negotiated purchase of lands for the conveyance and associated facilities would compensate for salvage value accordingly. According to Cooperative Extension cost of production studies, permanent structures, irrigation systems, and drainage systems can represent a wide range in investment, from less than $100 per acre for field and vegetable crops up to more than $3,000 per acre for some orchards (UCCE, 2008 and 2011)). Most of these facilities would not be new, so their depreciated values would be substantially lower.

Land improvements, including orchards, would also be considered during negotiations for land purchases. Typical investments required to bring permanent crops into production were described in Section 22.2. Forage crops, such as irrigated pasture and alfalfa, would require an establishment cost of approximately $400 per acre. The depreciated values of the growing stock could be substantially below these establishment costs, depending on the ages of the stands that would be affected.

Construction and operation of Alternative C would reduce the total value of agricultural production in the Primary Study Area. DWR and Reclamation would provide compensation to property owners for the fair market value of any property acquired through eminent domain for the Project. Similar to that described for Alternative A, the expected decrease in the total value of agricultural production would be less than five percent of the total value of agricultural production in the Primary Study Area. Therefore, a **less-than-significant impact** is expected to the agricultural economy in the Primary Study Area, when compared to Existing Conditions and the No Project/No Action Alternative.

Impact Socio-6: Substantial Adverse Effects on M&I Water Use Economics

Refer to the **Impact Socio-6** discussion for the Extended Study Area. That discussion also applies to the Primary Study Area.

22.4 Mitigation Measures

Because no significant or potentially significant impacts were identified, no mitigation is required or recommended.

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